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CONTENTS

Page	Page
The Treatment of Erysipelas with Erysipelas Streptococcus. J. E. Gordon, M. D.; D. C. Young, M. D.	353
The Management of the Tonsil Patient. S. E. Barnett, M. D.	357
Radium and Its Usefulness in the Treatment of (a) Malignant Disease (b) Uterine Fibroids and (c) Metrorrhagic Bleeding of Unknown Origin. H. W. Hewitt, M. D.	366
Some Essentials in the Treatment of Diabetes Mellitus. Leonard F. C. Wendt, M. D.	376
Some Problems Connected with Cancer. Reuben Peterson, M. D.	380
Renal Actinomycosis with Particular Reference to Urinary Findings. Pauline Beregovoff, M. D.	383
Michigan's Department of Health. Guy L. Kiefer, M. D.	386
Editorials—	
Post-Graduate Medical Work	397
Medical Legislation	398
Malpractice Again	398
Tuberculosis	399
Renal Physiology	399
The Making of a Medical Journal	399
A Precedent Established	400
Fractures	400
The Upper Road in Medicine	400
News and Announcements	401
Deaths—Doctors Joseph E. Bennett and Colin McCormick	402
County Society Activity	403
Communications	411
The Doctor's Library	412

THE TREATMENT OF ERYSIPELAS WITH ERYSIPELAS STREPTOCOCCUS ANTITOXIN*

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The announcement of a new and apparently successful treatment for erysipelas demands more than the usual critical analysis. Almost every conceivable form of management has been advocated for this disease, based chiefly on the application of local remedies. Failures have been legion, and usually have ended in a return to the old method of iced compresses. Methods depending upon general or systemic measures have included nonspecific protein therapy, and the use of serums and vaccines. We have consistently failed to obtain appreciable results with antibacterial serums developed from antigens of varying sources, including strains of streptococci isolated from the lesions and blood stream of erysipelas patients. In 1925 Birkhaug¹ was impressed with the analogy between scarlet fever and erysipelas and influenced by the work of the Dicks² on the hemolytic streptococcus of scarlet fever, applied sim-

ilar methods to the study of the hemolytic streptococcus of erysipelas. He found the micro-organism to be immunologically distinct from the type involved in scarlet fever and from most other sources. He was able to obtain a soluble toxin³ from suitable broth cultures and with the toxin immunized horses. This horse serum was used in the treatment of 60 cases of erysipelas with really striking results⁴. In September 1927, Symmers and Lewis⁵ of Bellevue Hospital, New York City, reported 131 cases treated with similar serum and with equally favorable results.

An unconcentrated serum made essentially according to the method of Birkhaug

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was first used by us in 1926. The results were disappointing in that no real differences could be determined between the group of patients treated with serum and a control series having the usual symptomatic management.

A new serum was prepared by Parke Davis & Co., using both whole bacterial bodies and soluble toxin as antigens. It was concentrated by a process similar to that used in the preparation of diphtheria antitoxin, to give a potency approximately four times that of the original product. We deemed it necessary to increase the average dosage, in general to eight times the original antibody content. This serum has been used in the treatment of erysipelas since January, 1927.

METHOD OF INJECTION

Both the intramuscular and intravenous routes have been used. At times really remarkable results can be obtained by intravenous injection but the dangers attendant to the use of this method in the advanced age group, which includes the majority of erysipelas patients, outweigh the advantages. Anaphylactic phenomena in older adults have in our experience been definitely more serious than in young persons. For this reason we rarely use other than intramuscular injections and indeed serum intravenously is unnecessary in most instances. We reserve intravenous injections for patients with a demonstrated septicemia or in critical condition. If serum is given by vein, it is best to dilute it with 250 cc. to 500 cc. of physiologic saline solution, and to inject slowly by gravity. The intramuscular is the preferred route.

DOSAGE OF ANTITOXIN

Erysipelas streptococcus antitoxin, like scarlet fever streptococcus antitoxin, is standardized on the basis of the antitoxin required to neutralize one skin test dose of toxin. The skin test dose of toxin is the smallest amount of toxin that will produce, when injected intradermally, an area of erythema 1 cm. in diameter. Commercially, the product is marketed as one therapeutic dose and contains 500,000 neutralizing doses, 5,000 units, of antitoxin. That amount is in most instances insufficient. The reaction of the individual patient, and that depends upon the balance between infection and resistance, must in each instance determine the dosage. Two particular considerations constitute important guides. The one, common to all serum therapy, is the duration of the disease be-

fore institution of treatment. Patients receiving serum early respond most promptly. With erysipelas the most important factor is very definitely the part of the body involved. Infections of the body regularly require the most serum. Erysipelas of the extremities ranks closely, while facial erysipelas as a rule responds to one or two therapeutic doses. In any case, the antitoxin should be administered in excess rather than in too small doses. We ordinarily give 5,000 units when the patient is admitted to hospital, repeating at intervals of about 24 hours until the erysipelatous eruption is limited or subsiding, the edema subsided and the temperature declined to approximately normal limits. One therapeutic dose, about 10 cc., was sufficient in about one-third of our cases, another third required double that amount, while the remaining cases received up to 100 cc. The larger amounts were generally required for patients with involvement of the body or extremities.

EFFECT OF ERYSIPelas STREPTOCOCCUS ANTITOXIN ON THE CLINICAL COURSE OF ERYSIPelas

Possibly the most exact evaluation of the serum would have been attained by its use with alternate patients. Because of the great variation in clinical severity of erysipelas, such a plan would have included in the serum treated group many patients who would have experienced a favorably self-limited course, particularly those with milder facial infections and recurrent erysipelas. We chose to subject the serum to what we know was a far more rigorous test but one which is more difficult to evaluate statistically because of lack of comparable controls, a test which could be appreciated only by actual contact with patients on the wards. Those most severely ill, including all with an initial doubtful prognosis, were selected for serum treatment. The first named plan would in our opinion have led to greater contrasts, than the results which we obtained with selected cases. The general difference in severity of serum treated and control patients is well evidenced by the accompanying composite fever graphs which represent consecutively admitted patients of a given group.

This report deals with the 248 erysipelas patients admitted to Herman Kiefer Hospital during the calendar year 1927. Results based upon experience with the disease during certain seasons only, are liable to inaccuracy because of well recognized seasonal variations in severity. To an extent there are clinical variations from

year to year. The mean of several years experience, together with the greater accuracy conferred by larger numbers, will be required before a final opinion can be advanced.

The behavior of the fever is an important index of the general clinical course of erysipelas. Distinct variations in the curve are dependent upon the part of the body involved in the process. Chart 1 rep-

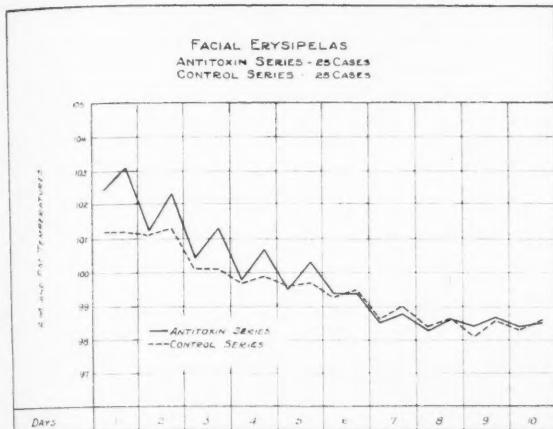


Figure 1

resents composite curves for consecutive cases of facial erysipelas. Serum treated cases had a well marked decline on the second day, while the fever in control cases was maintained at a fastigium. Relatively the progressive decline during succeeding days was much greater, so that by the sixth day both groups showed the same fever level, although the initial temperature for the serum treated patients was far higher. The same is true, Chart 2, of

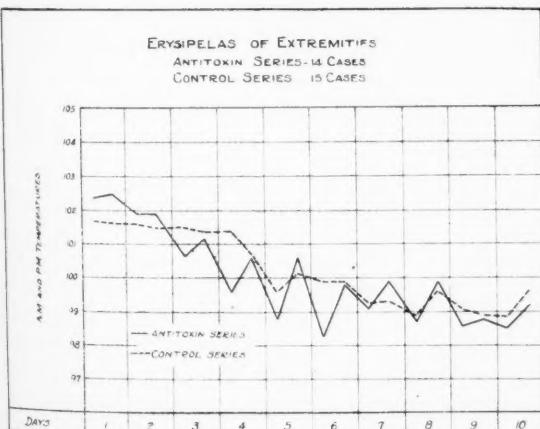


Figure 2

infections of the extremities. The curves are much less regular with erysipelas of the body, Chart 3, because of the usual added factor of pyogenic complications. Of greatest import is the fact that for the total 248 cases, the average duration of the

fever in days was actually less for the severe cases treated with serum than for the milder control cases.

The general clinical effect is more difficult to evaluate, but is generally favorable

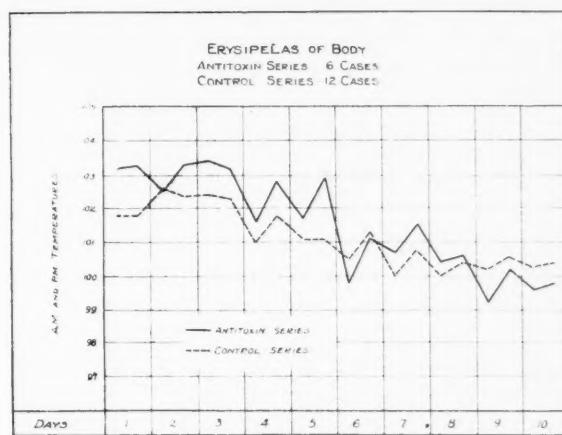


Figure 3

and comparable to that after the use of scarlet fever and diphtheria antitoxins. The toxemia is lessened and the patient's condition generally improved.

In an attempt to more accurately determine the effect on the local lesion the boundaries were marked with a soluble dye when the patient was first seen, and the spread each day determined by extending the markings. Forty patients had no extension of the lesion after injection of serum, after the first day it was limited in 11 more, an additional 12 after the second day. Two-thirds of the patients had no further spread after the third day. In general the total extension was not more than 10% of the area involved previous to injection of serum. Only one case of creeping erysipelas was observed in the face of serum therapy. Limitation of the lesion was followed rather rapidly by absorption of the blebs and edema, with fading of the erythema in the affected parts.

REQUIRED HOSPITALIZATION

Recovery from facial erysipelas is more rapid for patients receiving serum by approximately 40 per cent. Control patients required hospitalization for an average of 16.5 days, serum treated cases, although representing severe infections, only 10 days. The economic saving both to hospital and patient would on this basis alone warrant the use of antitoxin. Little or no difference in hospital days existed between the two groups if the erysipelatous process involved body or extremities. This is due not to the primary infection itself but to extended hospitalization demanded by ab-

cesses, which characterize these forms of erysipelas.

COMPLICATIONS

The most serious complications of erysipelas are subcutaneous abscesses developing immediately beneath the affected skin area. They vary in size from those of negligible proportions to extensive infiltrations of pus. The incidence of abscesses seems to be about the same whether or not antitoxin is used. The number of secondary pneumonias observed is too small to be significant. The frequency of serum sickness, 4.8 per cent, is of particular interest. Relatively few cases of erysipelas occur in children of school age, the group who are so commonly artificially sensitized to horse serum. Erysipelas is primarily a disease of infants and adults, few of whom are sensitized. The incidence of serum reactions after this serum is scarcely one-seventh that following diphtheria or scarlet fever antitoxins. The explanation would seem to rest in the type of person receiving the serum, for these products are prepared by similar methods.

RECURRENT ERYSIPELAS

The use of antitoxin does not provide results beyond the immediate illness. Of the control patients 11.7% had had previous attacks of erysipelas; of the serum treated patients, 14.5%. The percentage of known recurrences following the attack for which the patient was admitted was almost identical for the two groups, 6.8% in the control series, 6.4% in the antitoxin group.

MORTALITY

With any disease, the results of therapeutic measures must in the end be judged by their influence on case fatality. This is difficult with erysipelas. So extensive and varied are the pathologic conditions associated with the disease, that it is most difficult to eliminate the contributing factors and to deduce from the remainder an intelligent conception of erysipelas as a direct cause of death.

Case fatality moreover, depends to a large extent on the part of the body involved, whether it be facial, body or of the extremities, and upon the age of the patient. Deaths are most frequent among infants and in the older age groups. Comparing the case fatality rate for control patients and those receiving serum, the greatest difference is in the age group from one to twenty years. Young adults twenty to forty years of age had a fatality about one-half that of patients who were

not treated with serum. The difference was less marked with older adults. Infants under one year not only had the highest rate of any age but the infection was least influenced by serum.

One of the most significant features in this series was the fact that the greatest differences in mortality were apparent with those types of the disease commonly most exacting of life, erysipelas of the body and of the extremities, Table 1.

Table 1
CLINICAL TYPE OF ERYSIPELAS
Case Fatality Rate

	Facial Cases	Facial Fatality	Extremities Cases	Extremities Fatality	Body Cases	Body Fatality
Control	353	12.1	16	12.5	31	48.4
Total Cases	209	6.2	24	12.5	15	20.0
Antitoxin Treated, 1927	97	9.2	15	6.6	12	8.3

The number of cases observed, particularly of the body and extremities, is rather too small to form general conclusions. Perhaps the best indication of the results from antitoxin treatment can be deduced from a comparison of the case fatality for erysipelas of all forms during the past several years at this hospital, compared with the year during which antitoxin was used for the more severe cases. Conditions over the periods compared are much the same. For the five years previous to 1927, 887 cases were treated with a case fatality of 13.5%. During 1927, the rate for 248 cases was 7.6%, Table 2.

Table 2
ERYSIPELAS
Annual Case Fatality Rate

Date	Cases	Deaths	Per Cent Fatality
1922	154	14	9.0
1923	172	29	16.8
1924	162	17	10.5
1925	308	42	13.3
1926	91	18	19.9
Total 1922-26	887	120	13.5
1927 Antitoxin	248	19	7.6

SUMMARY AND CONCLUSIONS

During 1927, 248 patients with erysipelas were admitted to Herman Kiefer Hospital. One-half had the usual symptomatic treatment. Those most severely ill received erysipelas streptococcus antitoxin. Results obtained with the serum were sufficiently encouraging to warrant further observations.

If one may judge by the behavior of the fever, the effect on the local lesion and the number of days in hospital, the clinical course was apparently favorably modified by the use of streptococcus antitoxin.

The serum seemingly has little effect beyond the immediate illness. It does not af-

fect the tendency of the disease to recur. Complications, particularly abscesses, while numerically as frequent, were perhaps clinically less severe.

The relationship to the number of the deaths is difficult to determine because of the many and varied pathologic conditions associated with this disease. Nevertheless the case fatality for the previous five years

was 13.5%, during the year antitoxin was used, 7.6%.

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THE MANAGEMENT OF THE TONSIL PATIENT

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The tonsil operation is so frequent an occurrence that it has become many times a more or less perfunctory routine. This attitude does not reflect to the credit of the profession nor does it bespeak of the highest principles in medical practice. The profession has been wont to classify the tonsil operation as belonging to the group of minor surgical procedures. This fact has probably in great measure been responsible for the disrespect of the tonsil operation. However, minor or major, whatever the classification may be, the tonsil operation must be regarded by its very nature to be attended with much danger. Yet in spite of this it is not uncommon to obtain a history where the patient having presented himself with his own diagnosis has had his tonsils removed without further ado.

If we are to be honest with ourselves and with our patients, we must first be fully assured of the necessity of operation, and secondly we must employ all measures tending to the safety of the patient. Necessity of a tonsil operation as pointed out by Hastings¹ depends not solely on the examination by a laryngologist, but also on a complete study of the patient to determine all possible factors responsible for the invalidism, rheumatism, heart-trouble, colds or whatever it may be. Carefulness and discrimination will avoid a hurried and often a painful and useless operation.

In determining the necessity of a tonsil operation much can be learned from a study of the patient's complaint. This may have to do with some local disturbance such as sore throat, or some systemic condition as arthritis. It must be determined at this point whether the symptoms are in fact due to tonsillar disease or whether it might be due to some other source as sinusitis, dental caries, and so on. A careful examination of the nature of the complaint helps also in safeguarding the patient in the event of operation as will be shown later. Complaints such as the fol-

lowing are used by Cohen² as a positive indication for operation: 1, Recurrent tonsillitis; 2, attacks of tonsillitis followed by rheumatism; 3, attacks of tonsillitis followed by heart disease; 4, tonsils that cause difficulty in breathing and swallowing; 5, cases of otorrhea of six weeks' duration; 6, repeated attacks of earache in spite of normal drum; 7, history of quinsy; 8, diphtheria; 9, cases of chorea and arthritis when all other sources of infection have been investigated and treated without avail; 10 history of nasal hemorrhage in children. Quackenbos³ names as indications for tonsil operation also the following: 1, Hypertrophy associated with nasal hemorrhage or eustachian obstruction; 2, reflex cough due to tonsil tag; 3, nocturnal anuresis in the absence of an acid concentrated urine; 4, chronic otorrhea; 5, chronic nasal discharge with the elimination of the sinuses as the causative factor; 6, petit mal.

The study of the complaint should be augmented by a careful review of previous sickness. Inquiry regarding lues, tuberculosis, hemophilia, and diabetes should be made. In females it is important to inquire as to the date of menstruation. By doing this complications and severe hemorrhage can be avoided at the time of operation. The age question in regard to tonsil operations in the very young and also the older patients presents itself for solution by the physician. In my opinion, age in itself is no determining factor.

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There should be no more age limit for tonsil operations than there should be for appendix operations. Replies to Swain's⁴ questionnaire to a hundred leading pediatricians advised against delay because of age. There are very few cases however under the age of three years that require more than a simple adenoid operation. Pilot⁵ in his investigation found that the adenoid with its many folds and deeper crypts harbor larger numbers of bacteria, especially hemolytic streptococci, than do the tonsils. The removal of the adenoids has a most favorable influence not only post-nasally, but in the throat as well. The youngest tonsil patient I have operated on was an infant of nine months that was so completely filled with tonsillar and adenoid tissue, that respiration and deglutition was carried on with great difficulty. Cachexia was present and there were signs of impending acidosis. In this case an adenoid operation would not have been sufficient, and delay could have resulted in much harm. In regard to the aged, it is my practice, to be very conservative in advising a tonsil operation after the age of fifty years. Many of these latter cases are referred for operation because of some chronic complaint such as "rheumatism." Observers such as Kaiser⁶ have found that the removal of tonsils does not influence favorably the progress of this particular disease. It must be remembered, too, that at this age, there is a distinct atrophy of the tonsillar structures. When examined histologically, it will be found that there is a decrease in the crypts and surface epithelium. In respect to chronic diseases, it is a frequent experience of the laryngologists to have cases referred with the request that he determine whether the tonsils are the sole cause of the patient's disability. This is not an easy task, for in fairness to the patient all possibilities must be considered and evaluated and only then can a true measure be had of the part the tonsil plays. It is my opinion that the tonsil plays but a minor role as a focus of infection in the aged.

The examination of the tonsil patient should be complete and can be divided into (a) local, (b) general, (c) laboratory. The local examination can be done by the referring physician or more completely by the laryngologist. This part of the examination should include the nasal structures, i. e. septum, turbinates, and sinuses. The post-nasal region is best examined digitally, in children, and with pharyngeal mirrors in adults. The nasopharyngoscope

may also be employed to advantage. The mouth including the gums, teeth, and palate should be thoroughly investigated. The contour of the palate plays an important part in its effect on the nasal structures. A high, narrow arched palate may be entirely responsible for the nasal pathology. Examination of the tonsils must of necessity be thorough. The examination is not complete until a knowledge is obtained as to the condition beneath the surface. The use of pressure, tonsil inverters, or suction are helpful. The size of the tonsil is no criterion as to its pathology. The small, buried tonsil should always be considered with suspicion. This point is emphasized by Dawell⁷ who also advises the search for enlarged cervical lymph nodes.

The general examination is best carried out by the referring doctor who has the advantage of knowing the patient best. Examination can also be done by the pediatrician or the internist. Attention should be directed to the condition of the heart, lungs, blood pressure, and reflexes. In infants and children, more accurate attention to the lymphatic system is necessary. It must be remembered that the early years of infancy and childhood are what may be termed "the lymphatic age." It is during this age that there is present a generalized lymphatic hypertrophy. There is not only an enlargement of the adenoids and tonsils but there is also an enlargement of the cervical glands, mesenteric glands, Peyer's patches, and lymphoid tissue around the appendix. This latter is interesting from the standpoint of the relationship between tonsillitis and appendicitis. In the early years of life, the pathological entity known as status lymphaticus is most prevalent. It is the age, too, in which the thymus gland plays a most prominent part. The very fact that the majority of tonsil patients come to operation during the "lymphatic age" should serve to put us constantly on guard. Deaths are not infrequently reported due to thymic involvement. Thuisfield⁸ reports five such cases. Wolf's⁹ case report is typical. A well nourished child of eleven months was given a light anesthesia for a congenital cataract operation. Respiration stopped shortly after operation was begun, and this was followed by cardiac failure. Autopsy findings were negative, except for an enlargement of the thymus and the lymphatics. The lymphatic patient is easily subject to shock and acidosis. This is particularly so in hot weather.

This concurs with the observation by Lott¹⁰ that all children seem to have more shock and depression if the operation is done during hot, humid weather. This history of laryngitis stridulus should be taken as a warning of an enlarged thymus. Rooth¹¹ reports a case in which this complaint was so marked in an apparently healthy boy of eighteen months that he was hospitalized in preparation for a tonsil and adenoid operation. However before this could be done, he suffered another attack which proved fatal. Autopsy findings revealed a thymus of one ounce and six drachms, compared to the normal averaging two drachms. Fisher¹² reports two thymic deaths; in one case the gland weighed 37.8 drachms and the other a boy of ten years in which the gland weighed 30 drachms. No other pathology was found in these cases except general lymphatic hypertrophy especially of Peyer's patches. Blumer¹³ concludes from his observations that two classes of patients are subject to thymic complications, namely, simple or exophthalmic goitre, and patients with hypertrophied adenoids and tonsils. Gerstley¹⁴ feels that an enlarged thymus per se is no contraindication for tonsil operation. He reports a case with an enlarged thymus confirmed by X-ray diagnosis of a boy three years old, safely operated upon under ether anesthesia. He concludes that a careful history and study of each individual patient is necessary in determining the factor of safety. It is safe to say that many undiagnosed thymus cases have been safely operated on. H. P. Mosher, A. S. McMillan, and F. E. Motley¹⁵, report a series of nearly five thousand consecutive cases, between the ages of two to sixteen years. X-ray examination showed seven per cent of all cases had an enlarged thymus. It is now generally accepted that the thymus gland is an organ belonging to the period of growth and development. It reaches its maximum at puberty and then undergoes involution, but does not entirely disappear during life. An abnormally enlarged thymus readily responds to Roentgen therapy, and this is the treatment of choice before operation.

The question not infrequently arises as to how soon after an acute process, such as endocarditis, rheumatism, or tonsillitis can the tonsils be safely removed. In answer to this, one cannot follow any definite prescribed rule. Each case must be determined on its own merits. It seems reasonable, however, that the sooner the focus

of infection is removed, the better for the patient. Approximately two weeks is sufficient in most cases for the patient to build up enough resistance compatible with the operation. Lott¹⁶ advises against general tonsil operation within three months of acute respiratory disease. He bases his conclusions on observations of ten thousand cases.

A routine laboratory examination for tonsil patients is a factor not to be overlooked. A minimum requirement should be a urine examination, a coagulation test, and a hemoglobin test. Further examinations when indicated are Wassermann test, blood counts, cultures from nose and throat, and X-ray examination. The exact value of a coagulation test as a check for bleeders has been more or less in dispute. Nevertheless, it should be carried out routinely, for a delayed coagulation demands further investigation. The method employed at my office is to prick the finger and establish a flow of blood. A capillary tube of .7 mm. and two inches long is applied to the bleeding area and by capillary action the tube is filled. As normal blood does not clot under two minutes, the test may be started at two and one-half minutes. A piece of tubing is broken off and this is repeated every half minute until it is found that upon breaking the tube a long stringy clot is obtained. This gives the clotting time, which varies in the normal from three to eight minutes. It has been noted by Walsh¹⁷ that in chronic tonsillitis the white count is markedly increased. The findings in his series of two hundred cases were an average of 16,700 w.b.c. before operation, and 6500 after operation. Cultures are of importance in detecting contagion, and should be done within 48 hours of the operation.

Frequently there is an extended delay between the time of examination and the appointment for operation. In these instances, re-examination is necessary before operation is performed. Pulse and temperature should be taken on admission for operation. This is very important.

Once the decision to operate has been made, there is still much to be done for the comfort and safety of the patient. It may be advisable at times to postpone the date of operation until the patient's resistance is more fully established. The neurotics should be given sedatives; the anemic, iron; the undernourished, diet and tonics. Children with tendency to glandular hypertrophy respond very nicely to the syrup of iron iodine. The ultra-violet

radiation can be used with much advantage in many preoperative tonsil cases. The use of calcium lactate should be prescribed as a routine for its hemostatic action. The value of calcium lactate for this purpose has not been generally accepted. In my experience, it appears to have a distinct value. According to Hare¹⁸ the action of calcium lactate takes place in a few hours and lasts for several days. The average adult dose is twenty grains and six to eight doses are given three times daily. A prolonged feeding of calcium lactate will have the opposite effect, and decrease coagulation. This may account for the discrepancy in the results of various observers. The use of parathyroid gland with calcium in doses of 1/20th grain has been advised by such workers as Collip¹⁹ on the theory that the parathyroid increases the absorption of the calcium. Most pharmaceutical houses prepare this combination in either pill or capsule form. It has been my practice to give tonsil patients a printed list of instructions to be carried out before operation. This contains advice as to diet, catharsis, medication, etc. The value of these printed instructions cannot be overestimated in the avoidance of misunderstandings and in the carrying out of pre-operative orders.

The choice of anesthesia should be made at the time of the appointment for operation. The type of anesthesia depends, of course, on the individual merits of the case. As a general rule adults are advised a local anesthetic. The advantage of local over general for tonsil work cannot be denied by anyone experienced on the subject. Some of the advantages as enumerated by Sonnenschein²⁰ are as follows: First, there is either no nausea, or if there is any, much less than with general anesthesia. Secondly, there is the avoidance of aspiration pneumonia. Third, the time of operation is usually considerably shortened as compared with a general anesthetic particularly in adults. Fourth, there is usually less immediate discomfort in that the patient can take ice, fluids, etc., shortly after the operation, whereas with ether it is necessary to deprive the patient of these things for a considerable length of time. Fifth, there is a voidance of the ill effect that ether or chloroform may have upon the general system, such as cardiac depression, nephritis, or the induction of a coma in diabetes. Sixth, the swallowing of blood and the consequent vomiting are usually eliminated in that the patient is able under local anesthetic to expectorate the blood

that accumulates in the throat. For a more complete understanding of local anesthesia in tonsil cases the reader is referred to such works as King²¹ that contain not only a comprehensive treatise on local anesthesia but also include a supplement on the toxic effects of local anesthesia and the reports of various committees appointed by the American Medical Association to investigate the subject.

When the patient presents himself for local operation, it is my practice to give him at once two tablets of allonal. The purpose of this drug is two-fold. (1) It overcomes the fright and anxiety that accompanies many patients to operation. This drug acts as a ready sedative without at all interfering with the pulse or respiration. (2) Allanol because of its barbiturate base (allyl-isopropyl-barbiturate) acts as a prophylactic against the toxic actions of local anesthetics, particularly cocaine. Its action is quick, the hypnosis taking place from 10 to 20 minutes after ingestion. This drug is also quickly eliminated, 24 hours being necessary for its complete elimination. In European clinics as well as in this country barbital is given intravenously in the advent of toxic reaction from local anesthesia. My suggestion is that the method of attack is prophylactically and not as a method of emergency. One-half hour later the patient is given hypodermically a tablet of H.M.C. No. 1. This tablet contains $\frac{1}{4}$ grain of morphine and 1/200th of hyoscine. Hurd's²² observation confirms the synergistic action of the morphine and hyoscine (the latter being the same drug as scopolamine, the so-called twilight sleep drug). This preparation produces no marked change in heart beat or blood pressure. There is some slowing of the respiration, and within a short period after administration, the patient will be found completely relaxed and frequently somnolent. In obstinate cases, it may be necessary to give a second smaller dose of H.M.C. at a period of from an hour to an hour and a half after the initial dose. The patient having reached the somnolent stage is now ready for operation. Hurd believes, and I completely agree with him, that many of the deaths reported due to toxic action of local anesthesia are due not to the toxic action of the drug itself, but to the over stimulation of the sensorium as in fright and mental shock. The relaxation of the patient produced by the preparation herein mentioned, avoids this latter complication. Not only is the patient mentally at ease, but it will be found on

operating that the pharyngeal and laryngeal reflexes are not at all disturbing. Two drachms of one per cent apothecin without adrenalin is injected behind the posterior pillars and anteriorly in the region of the glossopharyngeal nerve. No cocaine is used in the throat because of danger of swallowing and absorption. No adrenalin is used because of its action on the blood pressure and the danger of secondary hemorrhage. A small swab of 10 per cent solution of cocaine hydrochloride is placed intra-nasally in the region of the sphenopalatine ganglion for a moment. This relaxes the soft palate. Inasmuch as the throat is relaxed, the operation can be done quickly with very little trauma or bleeding. The patient on being returned to bed usually falls into a sound and restful sleep. While Hurd sends his patients home in two or three hours, it is my practice to keep them under observation from eight to twenty-four hours. By this time the patient has completely reacted from the medication and can return home with his faculties unimpaired. My experience with this method has been over a period of eight years with exceedingly gratifying results.

In operating on children, the avoidance of shock is equally important. Children with their keen mentality frequently undergo much mental anguish that can in a large measure be avoided. The pernicious custom of fooling children when they are brought for operation is to be condemned. The nature of the operation should be explained, the benefits magnified, and the co-operation of the child sought. They should be told intelligently what to expect, and it is surprising how much easier it is for both patient and surgeon when this is done. In cases not so prepared, the child suffers mental shock not only at the time of operation, but manifests neurotic tendencies such as night terrors for a number of weeks after. In regard to the anesthetic, for general tonsil operation, it may be simple or as suggested by Gwathney²³ a quite elaborate preparation. I prefer a light ether anesthesia. It is safest and it is easiest. I do not use forced etherization as produced by foot pumps or electrical devices. I prefer that when the anesthetic is given, it should not be given to the point where the laryngeal reflexes are destroyed. The significance and importance of the light anesthesia in tonsil work is emphasized by the observations made by Meyerson²⁴. He made endoscopic examinations in a series of one hundred cases immediately following tonsil opera-

tions. In spite of the fact that many of the cases had a light anesthesia, in 79 of these cases there was found blood in the trachea and in the bronchi. Doctors Daily of Houston Texas, in report of one hundred cases at the St. Louis meeting, of the American Academy of Otolaryngology, examined endoscopically following tonsil operation confirmed the above findings. In cases of deep anesthesia 90 per cent showed blood in the trachea and bronchi. In light anesthesia the blood was swallowed and vomited. Lipiodol injections by the authors confirmed these clinical findings. Not only is a light anesthetic desirable from the standpoint of prevention of lung complications, but also in the detection of post-operative bleeding. In a completely relaxed throat, bleeding may be unnoticed but the return of reflexes and movement of the muscles may produce secondary hemorrhage. It is of course important when operating under light anesthesia that the surgeon develop a technic that is rapid and what is most important, thorough. Meyerson²⁵ reports that the lung tissue and smaller bronchial elements are temporarily damaged by an increased concentration and prolonged administration of ether. This produces an inability to expel aspirated material. The conclusion, therefore, must be self-evident. The ideal tonsil anesthetic must be of short duration and at the same time light.

The mere removal of the tonsils does not end the responsibility of the surgeon, until the patient is fully recovered and the assurance that no complications have set in. In order to avoid aspiration following the operation, the patient is placed so that he is resting on his abdomen with the head slightly dependent and the mouth open. This step should be taken immediately on the completion of the operation and not until the orderly gets there. If a light anesthetic had been used, there is of course no danger of a "locked jaw" or a "swallowed tongue." In order to hasten the reaction from ether so that emesis takes place in the operating room, re-breathing can be employed. This is done either by the use of carbon dioxide or by the simple contrivance of applying cold towels snugly over the patient's mouth and nose. This brings the patients back to bed very much awake and in turn not only shortens the recovery period but at the same time relieves the anxiety of the parents. A nurse should be at the patient's bedside until the patient is completely reacted. The post-operative pulse should be

taken in all cases every two hours. The color of the lips and conjunctiva must be noted and recorded at the same time. I have made this a hard and fast rule, for it is only in this way that post-operative hemorrhage escaping into the stomach can be detected. A sudden rise in pulse rate or blanching of the lips or conjunctiva calls for an immediate investigation in the operative field. The post-nasal region is the place of danger in children and must be rigidly inspected for suspicious bleeding. Dr. Shea advises that the adenoids be removed first and the tonsils secondly. In this way by the time the tonsils are removed any delay of bleeding from the adenoid region could be noticed.

The local case on return to bed is propped up with pillows so that he is resting in almost a sitting posture. This avoids congestion in the head with consequent bleeding. It also enables the patient to gargle if necessary and to take fluids without undue exertion.

It is my practice to give the patient on discharge a printed list of post-operative instructions. This includes a diet, and general instructions as follows:

1. Rest in bed two days.
2. Physic or enema on second day.
3. Ice collar to neck as long as comfortable.
4. Use medicines as prescribed.
5. Return to office for examination within a week.
6. Report any signs of bleeding.

The medication for children is neosilvol solution 25 per cent, to be dropped freely in the nose every two hours. If properly used this solution acts as a continuous bath to the denuded surfaces of the fauces and post-nasal region. Healing time is shortened and secondary infection and otitic complications are avoided. The local tonsil cases complain frequently of painful deglutition. The use of 15 grains of Bayer's aspirin dissolved in one-half glass of luke-warm water, as a gargle every two hours, is a specific for post-operative pain. Some brands of aspirin float on the surface of the water, and will not be as effective. In hypersensitive patients, the use of orthoform in $\frac{1}{4}$ grain lozenges is of much value. This is dissolved on the tongue as freely as desired. The combination of these two drugs should give relief in the most obstinate cases. There are many other remedies for post-operative pain. Their number is legion. Harkness²⁶, in a series of 1700 questionnaires to laryngologists, found the following drugs to be

most commonly used: Menthol, phenol, and a 15 per cent spray of cocaine. The ice collar is advised but not insisted upon. I think that the ice collar has become a fetish in rhino-laryngology. To insist upon its use when it distresses the patient is beyond reason. In the days of tonsilotomy with its free post-operative bleeding, there was probably an urgent need for ice applications. The dietary in the tonsil patient is a matter that very often receives but scant attention. A number of standard textbooks on dietetics give nothing on this important subject. By the very nature of the operation the patient if left to his own resort will deplete himself and prolong his recovery. The diet be rich in calories and easy to swallow. Frequent feedings are advised preceded by the gargle as directed before. The printed instructions contain the following information:

First day, (day of operation) use freely sweetened water or sweetened milk; also plain water or milk.

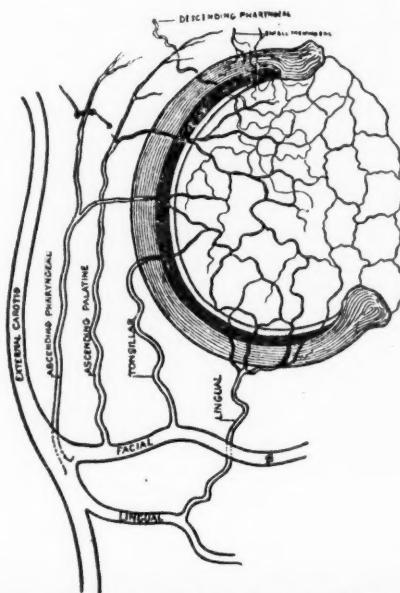
Second day, additional raw eggs, soft boiled eggs, milk toast, malted milk, jello.

Third day, custards, ice cream, cereals, broth.

Fourth day, as above.

Fifth to 7th days, full diet.

No acid foods (raw fruit, fruit juices, etc.,) for one week. The patient should return by the seventh day for an inspection of the operative field. At this time, further information as to diet, ability to return to school, work, or other activities can be given. If there is an excessive amount of granulation, this can be treated



Blood supply to the tonsils—From Barnhill, nose, throat, and ear.

with the silver stick. If there are no complications, the patient is discharged, or if there is necessity, he is to return for further examination and treatment.

As it is well known, all cases do not make a simple, uneventful recovery. Complications are not altogether uncommon. The most frequent of these are, 1, bleeding; 2, earache; 3, pulmonic; 4, nasality; 5, lymphoid tags. Bleeding is probably the most frequent complication. It is usually arterial, for the venous bleeding is easily controlled. It may occur at any time within the first twenty-four hours until complete healing of the throat has taken place, which in some instances means at least three to four weeks. Dubney²⁷ believes that delayed hemorrhage, is due to separation of a slough. Undue exertion on a thinned-out blood vessel will cause the bleeding. It is my opinion that the post-operative granulations which are very vascular, may produce secondary hemorrhage from trauma. The control of hemorrhage necessitates an understanding of the blood supply of the tonsillar area. The chief blood supply of the tonsil is from the tonsillar and ascending pharyngeal branch of the facial. The branches of these vessels enter the tonsils by piercing the superior constrictor muscle at the lower pole. The descending palatine branches of the facial send twigs to the upper pole. The arteria dorsalis linguae gives off branches to the anterior pillar and not infrequently to the upper pole. These superficial vessels bleed easily and are easily controlled. However, it is the vessels deep in the lower pole that are as a rule responsible for serious bleeding.

There are a vast array of methods for controlling bleeding. It must be remembered that before applying any medicament that the blood clot should be completely removed. The patient's head should always be elevated. The remedies that I employ with the best results are fifty per cent peroxide in ice water as a gargle, or insufflation of bismuth subgallate into the tonsillar fossae. Tilley²⁸ recommends the use of tannic acid. Green²⁹ advises the use of tissue juices. Pressure packs, either plain gauze or gauze saturated with hemostatic serum, can be employed. In my experience the use of sera is of more value before operation than after. In the use of sera one must think of the danger of anaphylaxis. Hypodermically such sedatives as codia or morphia may be used in adults with good results. In some cases, the post-operative bleeding may be due to

tonsil tags, the removal of which will stop the hemorrhage. Crowley³⁰ injects two per cent novocaine with five drops of adrenalin to the ounce under the surface of the bleeding area. If the bleeding does not respond at once after employing these agencies, suturing or ligature should be immediately applied. In the event of the loss of much blood a saline or blood transfusion should be done. When there is a history of pre-operative bleeding, blood typing must be done before operation and the donor should be within easy call. It is remarkable how quickly a transfusion will improve the pulse, blood pressure, color, and reaction of the patient. Though not common it is sometimes necessary to ligate the external carotid artery for serious tonsillar bleeding. Whale³¹ reports a case in which this was necessary.

A very frequent complaint following tonsil operation is pain in the ears. This may be referred pain from the field of operation or it may be due to actual pathology in the tympanic cavity. The majority of the cases are of the first type, and require but an assurance that the complaint is not serious. Inflammation of the middle ear, on the other hand, must be treated with care and discrimination. It is fortunate that in spite of the trauma incidental to a tonsil and adenoid operation and the proximity of the eustachian tube to the field of operation, there are so few ear complications. The fact that the operation aids in ventilation and drainage of the middle ear, is probably the benevolent factor. It must be remembered, though, that during epidemics of upper respiratory disease there is greater danger of ear complications.

Pulmonary complications following tonsil operations are of relatively frequent occurrence. Fisher and Cohen³² report five cases of lung abscesses in their own series, and 63 cases from the literature. As to the possible causes of this complication they give, 1, type of anesthetic used (general); 2, aspiration of blood, mucous or other detritus from the field of operation; 3, infective emboli carried to the lungs, from the field of operation, through the vascular and lymphatic channels; 4, faulty technic, especially undue tramatism of the site of operation; 5, use of motor driven ether vaporizing apparatus; 6, antecedent causes either local or general.

A fairly common sequella of tonsil operations is a condition that may be termed nasality. The patient acquires a distinct nasal speech that he did not previously

possess. This is probably due to a reflex disturbance of the soft palate, though Levborg³³ believes it is due to inquiry of the soft palate. The mucous membrane of the soft palate, is continuous with the mucosa of the posterior nares, nasopharynx, and hard palate. The nerve supply is from the large posterior palatine nerve coming out of the posterior palatine foramen, and the accessory palatine nerve. In operating care must be taken to avoid injury to these structures. Many cases of nasality are due to favoring the soft palate in talking and swallowing. Some cases of nasality are present before operation and are due chiefly to rhinologic pathology. In the latter cases, the operation may accentuate the complaint and the parents aided and abetted by some "well-meaning" physician will diagnose the complaint as an incomplete operation. An explanation of the existing nasal pathology before operation will avoid this misunderstanding.

A frequent source of annoyance both to patient and surgeon is the appearance of the so-called tonsil tags. These occur in spite of the most thorough enucleation of the tonsils. Enormous tonsil beds are filled in due to the fact that "nature abhors a vacuum." This "filling in" process is accomplished by a proliferation of lymphoid and granulation tissue from the surrounding region and particularly the base of the tongue. In many cases, this tissue increases to large size but usually atrophies or may be shrunk by the pure silver stick. Ballenger³⁴ advises the use, for this purpose, of equal parts of tincture of iron and glycerine. In some cases there remains a good sized tag that becomes the prey of all who inspect the throat in the future. Microscopic examination of this tissue shows it to be free of glandular elements and to all respects entirely harmless. This does not mean that there are no tonsil tags due to incomplete operations. There are unfortunately many cases of these, but the profession must learn to discriminate. Some unfortunates give a history of a half dozen operations, a reflection on the credulity of the laity, and the zealousness of the profession.

Some complications while not immediately serious are productive of much anxiety both upon the part of the patient and the physician in charge. Unpleasantness may take place in spite of the most careful attention to details that can be given. Two examples of this can be given as follows: Case one: H. S., girl, age 8 years was operated on for tonsils

and adenoids on July 11th. Temperature, pulse, and physical examination normal. No history of illness for period immediately antedating date of operation. The operation was done in the usual manner, and one hour after the operation the temperature had gone up to 100.5, by three in the afternoon the temperature had arisen to 103.00 but by careful sponging and nursing it descended to 100. The next day the temperature continued, fluctuating to 104 and accompanied by vomiting. The patient was examined by Doctors J. Bleier and S. Levin, without any findings as to the cause of the temperature. Everything was negative. The throat showed the usual post-operative reaction. On the third day the temperature and general debility continued and a blood culture was advised and taken by the Owen laboratory. The report the next day showed no culture in the blood and a white count of 10,200, 82 per cent polymorphonuclears. Red blood cells normal. On the fourth day there was a recession of the temperature and a hemorrhage from the left fossa. This was easily controlled and the patient showed some improvement until three days later the temperature mounted accompanied by pain in the right ear. Examination showed an acute otitis media. The drum was incised and a free serous flow escaped. The next day the temperature was normal, but there was pain and tenderness in the region of the right mastoid. Local treatment was prescribed and the patient from then on made an uneventful recovery. This case as can be seen encompasses most of the common complications. There was post-operative temperature; there was acidosis; there was post-operative hemorrhage; and finally an acute otitis. The possibilities in this case are that the patient was operated on during an incubation period of grippe or some other upper respiratory infection, or that the removal of the tonsils may have caused an increased amount of absorption from its own toxins. It is not uncommon to see a temperature of one or two degrees following tonsil operation and this is usually normal and is caused by saphrophytic organisms that infect the operative wound. A gargle of 50 per cent peroxide at frequent intervals is sufficient to overcome this and remove the foul smelling membrane present in these cases.

Case two with unusual post-operative reaction was that of P. R., male, age three years, operated on June 23, 1928. There was nothing unusual in the preliminary

examination or during the operative procedure. The patient made apparently an uneventful recovery the first day, except for persistent vomiting, which started during the ether narcosis and continued at periods of several hours throughout the entire day. The vomiting was bile-tinged and the patient would not retain the slightest amount of fluid. Conditions the next day remained the same with the exception that the patient was in a much weakened condition. Solution of soda and glucose by rectum was not retained and sedatives for the gastro-intestinal tract were immediately vomited. Thirty-six hours the patient was suffering from an intense acidosis due to the lack of intake of nourishment and fluids. Dr. S. Levin was called in consultation and he immediately administered glucose intravenously and this, together with more success by rectal administration of alkaline solution, brought the patient out of danger. It must be remembered that an operative case is depleted by restriction in diet before the operation and also by cahtarsis. Add to this an ether anaesthesia and add a very limited intake of food and fluids within the next 24 or 48 hours and we leave a path open for acidosis. It is my practice to force a rich carbohydrate feeding as soon after operation as possible. This can be done by the addition of Karo syrup or cane sugar to the water or milk in the post-operative dietary. As has been previously mentioned, there is more danger of acidosis and shock when infants and children are operated upon in the hot, humid mid-summer days.

Other serious complications can be enumerated. Sepsis severe enough to threaten life, deep cervical cellulitis resulting in abscess, and thrombosis of the internal jugular vein, extending through the lateral sinus into the cavernous with resulting loss of vision, in one or both eyes, are cases reported by Gleason³⁵. This author believes too that post-operative complications are encouraged by over-treatments following operation.

This treatise, while not intended as being either inclusive or conclusive, brings to the front some of the problems that are frequently overlooked, shunned, or forgotten, in the management of the tonsil patient. We are fortunate that complications, though common, are at the same time not frequent. The fact that the mouth, gums, and throat, constantly harbor many pathogenic organisms, make it remarkable that complications are not more frequent. It

is necessary, as already mentioned, to be reasonably sure that the tonsil operation will benefit the patient. Gettinger³⁶ believes as do others that the tonsils have an important function and advises that we should not be so enthusiastic in the removal. His theories given for the functions of the tonsils are: 1, The tonsil protects the organism from bacterial invasion; 2, internal secretion; 3, tonsil has hemopoietic function; 4, eliminative functive; 5, aids in producing immunity. Interesting in contrast to this are the findings of Kaiser³⁷ whose conclusions are the results of observation of 1,200 operated cases covering a period of three years, as follows: 1, Operation caused relief of sore throat, head colds, and mouth breathing; 2, lessens chances of having discharging ears; 3, it assures some protection against glandular infection; 4, it does not affect infections of larynx, bronchi, and lungs; 5, it reduces the severity of measles and scarlet fever; 6, it lessens the incidents of diphtheria; 7, it does not influence chorea and rheumatism; 8, lessened the incidents of heart disease; 9, reduces mal-nutrition in children.

The fact remains that while we sometimes go to extremes, the value of the tonsil operation cannot be questioned. More carefulness in the direction of the tonsil patient speaks for discrimination in advising operation, better management of pre- and post-operative details and the avoidance of serious complications. In this manner, too, the tonsil operation can be brought to the high surgical plane it deserves.

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RADIUM AND ITS USEFULNESS IN THE TREATMENT OF (a) MALIGNANT DISEASE (b) UTERINE FIBROIDS AND (c) METROPATHIC BLEEDING OF UNKNOWN ORIGIN*

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The discovery of radium by Madame Curie¹ was officially announced to the world in a paper read before the Academy of Sciences of Paris on December 26, 1898, but it was not until 1910 that radium was isolated as an element and thus made available for therapeutic use.

Commercially radium was first obtained from pitchblende, later carnotite ores found in Utah and Colorado were utilized for its extraction because these ores contained a higher percentage of the element. However, even from carnotite the extraction of radium was expensive, requiring 11 tons of coal and 500 tons of chemicals to produce 1 gm. The element is now obtained almost exclusively from the Belgian Congo.

Radium belongs to that group of metals known as the alkali earths, its atomic weight being 226.45. In its preparation it is isolated as radium barium chloride, from which salt, the bromides, chlorides, sulphates and carbonates are prepared. The chlorides and bromides are soluble, whereas the carbonates and sulphates are insoluble. The various therapeutic applicators are made from the insoluble radium sulphate while radium emanation or radon, as it is sometimes called, is obtained from radium chloride.

An interesting point in passing, is that the loss of radium activity is so small, that it is spoken of in the terms of a period; one-half of the atoms remain after 1,680 years; one-fourth after 3,360 years, etc. Radium rays are invisible, but are known to be present because of the possession of certain physical and chemical properties, viz.: (1) the rays affect a photographic plate the same as light; (2) they excite phosphorescence; (3) they cause air and gases to become conductors of electricity; and (4) they generate heat.

The rays are of three distinct kinds; alpha, beta and gamma. The alpha rays are not considered here because these are

so weak as to be readily absorbed by a sheet of ordinary paper.

Beta rays are negatively charged electrons, represent 3.2 per cent of the total energy emitted and have a velocity of 300,000 k.m. per second. Soft, medium and hard beta particles may be distinguished. Beta rays are noted for their caustic properties. The hardest of this type of ray is absorbed by 1.2 cms. of epithelial tissue.

The most important of all, however, is the gamma ray, which constitutes approximately 5 per cent of the total energy and has a speed of 300,000 k.m. per second. Radium A, B and C are successive members of the gamma series and are produced by the decomposition of the element. When sufficient radium C has been formed, the gamma rays are emitted. Light, X-ray and gamma rays are measured in Angstrom units. The Angstrom unit is one ten-millionth of a millimeter. The length of gamma rays from radium C is so minute that it requires measurements in thousandths of an Angstrom unit. Gamma rays are extremely penetrating for living tissues; and are absorbed by every uniform substance. The rays of radium are superior to X-ray because they are of uniform length, while the X-ray bundle is always made up of a mixture of waves of different lengths.

Radium emanation or radon is recovered from solutions containing radium by means of vacuum pumps, can be placed in

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containers and utilized the same as radium. The chief advantages of radon are: (1) that the "seeds" may be implanted in tissues (such as the tongue) and do not require removal unless platinum covered. (2) If mislaid or lost, the misfortune is small as compared to the loss of radium element. Ordinary glass tubes are seldom used because they permit beta rays, which are quite caustic, to pass through. Platinum 0.4 m.m. or gold 0.6 m.m. are filters commonly employed.

The disadvantages are (1) rapid loss of radium energy and (2) an activity which is not uniform. The element, on the other hand, is always ready for use, requires only occasional measurements and emits a constant amount of gamma rays. The unit of measurement is the milligram of radium element. In practice the measurement is never by weighing, but by electroscopic comparison with a known standard; the international standard is kept in Paris, a subsidiary one is kept in the Bureau of Standards in Washington, D. C. Radon is also measured by its gamma rays, a milicurie corresponding to a milligram.

In reporting a radium treatment the amount of radium or radon used, the duration of the application, the character of the filter, the size and shape of the volume radiated, and the distance from the source should be stated.

FILTRATION

The filtration of undesirable rays is accomplished by the interposition between the radium and the tissue to be radiated of metallic and non-metallic screens. Where gamma rays alone are desired, primary and secondary beta rays must be filtered out. This may be accomplished by the use of lead, brass, silver, platinum or aluminum for the primary rays, and gauze, rubber or wood for the secondary.

TISSUE REACTIONS TO RADIATION

Ewing states that both the nucleus and cytoplasm of the cells are affected but in varying degree depending upon the constitution of the cell, as follows: preliminary hyperemia, cell liquefaction, and necrosis, the appearance of phagocytic cells, the growth of granulation tissue, the extreme overgrowth of lymphocytes and plasma cells and the healing by supple scar tissue. The tough cytoplasm of the squamous epithelial cell must resist far more than the rapidly growing embryonal cell. Regaud believes that in every tumor there are mother cells which are the only

ones capable of multiplication while others become differentiated and incapable of growth. His observations apply mainly to squamous cell carcinoma in which there is a strong tendency toward differentiation and quiescence.

In the transitional cell type of epidermoid carcinoma such as arises from the tonsil, there is little tendency toward differentiation. Mitoses appear uniformly throughout the tumor and the neoplasms are highly susceptible to irradiation. As a rule the more highly undifferentiated the tumor cells, the more susceptible are these cells to irradiation. In lymphomatous tumors, the very abundant nuclear material breaks up rapidly into granules which are distributed in the tumor fluids. Bulky lymphosarcomas melt down in a few hours without any sign of intoxication. Bacterial infection greatly stimulates the division of many tumor cells, but does not render the tumor more susceptible to radiation. Streptococcus infection is a real and frequent stimulus to the growth of the squamous cell carcinoma and cannot be controlled by radium. The infection seems to interfere with tissue repair induced by radiation, and destroys the normal resistance of the tissue while poisoning the host. Since tissues are not merely aggregates of cells, but are highly complex systems of related and interdependent structures, purely chemical or physical data cannot explain their behavior.

One of the most obvious of physical phenomena is an increased permeability of the cell membranes. Cell ferments appear to be generally inhibited by irradiation and cell metabolism brought to a standstill. Animal tissues are very complex and their reactions depend not merely upon changes in the predominating cell, but upon the integrity of the blood and lymph circulation and other intercellular relations.

G. Schwartz (3) in 1907 pointed out that susceptibility to radium is in direct proportion to the growth metabolism of the tumor cells.

In vitro the metabolism of the cells is very low, so that they become resistant to irradiation. We must therefore look for the explanation of cell changes not merely in the cell itself, but in the tissues and the body as a whole. Among tissue reactions which are most important are the changes in the blood vessels, viz.: initial hyperemia followed later by induration. The initial hyperemia seems to be merely a somewhat peculiar inflammatory process with vaso-

dilation, exudation of serum and leucocytes. There can be little doubt that these inflammatory changes initiate and determine to a large extent the changes in tumor cell stroma and blood vessels of the affected part.

The importance of vascular changes following irradiation in the destruction of cancer has not been fully appreciated. The nutrition of many tumor tissues is abnormal and highly unstable. In squamous and glandular carcinoma infiltrating cell groups are nourished by the fine vessels of the invaded tissue and these neoplasms are resistant. Most tumor cells grow under pressure and very slight increase of pressure is sufficient to strangle cell masses under many circumstances. Necrosis of transitional cells and of squamous cell carcinoma in cervical lymph nodes, by external irradiation seems explicable only as the result of strangulation of the blood supply, because when these cells rupture the capsule, no amount of irradiation will control them. That irradiation actually closes blood vessels, fine ones at first, then larger arterioles or arteries later, is attested by the vaculation and swelling of the endothelial cells beginning in the latent period. Helfelder (4) describes rupture of capillaries, hemorrhage, thrombosis, compression of capillaries by exuded lymphocytes and plasma cells, growth of new connective tissue, swelling of all the coats of the large arteries, later arterial sclerosis and the anemic condition of the radiation cicatrix.

Ewing (2) believes that practical irradiation acts very largely through vascular disturbances and that changes in the lymph flow probably play a similar role. The radiation effects are, therefore, direct and injurious upon tumor cells and indirect and destructive through secondary factors. It is a peculiarity of irradiation that its effects are slow of development but persistent through generations of cells. Degeneration is followed by regeneration. Murphy (3) has shown that the effects of radiation therapy depend much upon lymphocytic infiltration or as he calls it, the mobilization of lymphocytes. Autopsies on carcinoma subjects reveal a notable diminution or even a comparative absence of lymphatic tissue. Whether the initial impulse to attack cancer cells resides in the lymphocytes, or whether they gather mechanically about degenerating tumor cells through closing of the lymphatics, we do not know, but that this gathering is often followed by atrophy of tumor cells

and that this process may be stimulated by irradiation are facts of importance. The lymph node is the great barrier to the dissemination of carcinoma. Lymph nodes are radio resistant. After heavy irradiation squamous carcinoma cells may be found necrotic while lymph follicles persist or even multiply. This observation encourages the preservation of lymph nodes in the neighborhood of squamous cell carcinoma, when not invaded and heavy irradiation when they are invaded. This view is somewhat antagonistic to that of the surgeon who extirpates normal cervical lymph nodes whenever he finds them adjacent to a malignant growth he may wish to remove.

Plasma cell reaction in quite an excessive degree is one of the characteristic features of radiation repair; it is found particularly in the uterine cervix after caustic dosage. The fact that one never sees cancer cells growing out into a field of plasma cells indicates that these cells, or the conditions under which they grow, are highly antagonistic to the carcinomatous process.

Connective tissue represents the end product of all the cellular reactions when it may have very scanty bulk and few or no cells. Very cellular connective tissue develops in irradiated lymph nodes, muscles and subcutaneous tissue. New capillaries often develop in connective tissue, producing the ordinary granulation tissue of healing wounds. Fat tissue with the low metabolism of fat deposits are highly resistant to irradiation. Normal bone resists all but very heavy irradiation, large dosage producing growth restraint with ossification, necrosis and hemorrhage, these bones becoming hard and brittle and sometimes fracture spontaneously.

In the treatment of bone tumors, primary or secondary, one cannot rely upon much cellular reaction, but must proceed upon the principle of growth restraint.

Ginsburg (6) has reported an extreme case where nearly every bone in the body was the seat of metastasis, which under irradiation caused great thickening of new bone while the patient lived for several years.

Lymphosarcoma, angioma, the germinative parts of the testicle and ovary, are more easily affected than other tissues. As a rule tumor cells are less tolerant than the tissue in which they are found and tumors in which the cells are of the embryonic type are more susceptible than the mature types of cells. In carcinomata of

the uterine cervix, the adeno-carcinoma is the most resistant; after this, the squamous cell, then the basal cell type the least resistant of all. The effect on uterine fibroids is largely an obliteration of the small blood vessels as mentioned above. It must not be forgotten, however, that radium affects normal as well as malignant tissues, the only difference being that some types of malignant tumors are more radio sensitive than normal tissues.

DIAGNOSIS

In the treatment of pathological tissues with radium an accurate diagnosis is extremely important.

The diagnosis of epitheliomata of the face, lymphosarcomata of the neck, etc., are simple and need not be considered here. Our principal difficulty is in the diagnosis of (1) carcinoma of the cervix or of the cervical canal, (2) carcinoma of the corpus uteri, (3) small uterine fibroids and (4) that class of cases which I have, for want of a better name, termed metropathic; this last class has often been designated "uterine fibrosis"—"metritis", "uterine insufficiency", etc., and implies changes in the uterine musculature giving rise to severe metrorrhagia or menorrhagia in which the exact pathological condition cannot be determined. Since these cases are associated with bleeding it might not be out of place to consider for a moment some of the causes of uterine bleeding in the menopausal years.

(1) Endocrinial.

It has been stated (Chalfont) (7) that the ovarian follicle initiates the uterine flow while the corpus luteum stops it. Excluding infections and malignant tumors of the ovary, and also ovarian cysts with twisted pedicle, there is little need to accuse the ovary as an etiological factor in excessive flowing in women at or near the menopause. The pituitary and thyroid have likewise been blamed for abnormalities in the menstrual flow; but these are more often factors in amenorrhoea than in menorrhagia.

(2) The most common factor is retained placenta or secundines, treatment of which will not be discussed here, also (3) ectopic gestation and salpingitis, which are purely surgical conditions. When a woman is past forty and bleeds profusely, either at her period time or between periods, the surgeon naturally suspects malignancy. It is imperative that this tentative diagnosis be either confirmed or disproven, then the method of

procedure is comparatively simple. In a suspicious cervix a biopsy will give the necessary information. Since I have been treating neoplasms with radium, I do not hesitate to do a biopsy upon any patient, using always, the cautery for removal of the specimen. In suspected carcinoma of the corpus, microscopic study of the curettings will reveal the pathological process. Many surgeons have written at length upon the danger of curettage disseminating the carcinoma to the fallopian tubes and the peritoneal cavity, but this has not been my experience, nor has it been the experience of other observers, among whom may be mentioned Chas. C. Norris. Norris reports two series of cases in which hysterectomy had been done; one with, and the other without, a dilatation and curettage, prior to operation; those in which dilatation and curettage had been done, followed by hysterectomy, showed a higher percentage of three-year cures than those in the other series without dilatation and curettage.

Uterine fibroids are usually easily diagnosed by bimanual examination. The diagnosis of uterine insufficiency, metritis or fibrosis or whatever one may choose to call this condition, is a more difficult problem. These patients suffer from severe menorrhagia or metrorrhagia, as well as nervous and other symptoms; dilatation and curettage reveal nothing abnormal; speculum inspection and bimanual examination determine nothing diagnostically positive; disturbed endocrinial conditions are sometimes held responsible, but there is usually nothing in the picture which is at all definite.

Premature arterial sclerosis has been given as a possible cause.

Theilhaber (8) has advanced the theory that the uterine musculature is unable to functionate properly due to the disproportion of connective tissue over muscular tissue in the myometrium. If the increase of muscle over connective tissue is abnormal the uterine wall loses its contractile power to such an extent that it becomes insufficient to control the menstrual period. Diagnosis must be made from carcinoma, abnormal endometrial gland hypertrophy, cervical or endometrial polyps, and uterine myomata. Retroversion of the uterus is occasionally a cause of excessive bleeding.

Abbe of New York is given credit for the first therapeutic application of radium in 1905, but precedence in developing this form of therapy belongs chiefly to the

French. The first important clinical report was that of Dominici and his pupils Cheron and Rubens-Duval who in 1913 published results in 158 cases of carcinoma of the cervix. H. A. Kelly in 1915 published the first important report in this country on the use of radium in malignant disease. Regaud's work dates from 1909 and Proust of the Hospital Tenon has also treated many cases. The employment of mass dose of radium was first recommended by Kroeig in 1914. In this country Bailey, Kelly, Schmitz, Clark, Ward, Ranchoff, Healy and many others have been active workers in the field.

TREATMENT—GENERAL PRINCIPLES

Radium treatment requires (1) a definite knowledge of the physical properties of the element together with a thorough understanding of the technic of application; (2) an accurate knowledge of its physical, chemical and biologic effects; (3) a careful diagnosis of the pathological conditions to be treated; (4) the amount of tissue to be radiated. Radium is a powerful therapeutic agent and much harm may be done if its rays are permitted to act upon tissues other than those intended.

In malignancy, the size of the tumor, its extension to contiguous tissues, the type of cell, the grade of malignancy, the possibility of metastases, etc., must all be considered.

With fibroids, the general consensus of opinion is that only intramural myomas should be treated and these not larger than a four months' pregnancy. Further, a full dosage should not be given except to women in or beyond their menopausal years, in other words, a careful selection of cases should be made in order to insure good results. Fibroids other than intramural should be submitted to surgical procedure.

(4) The general condition of the patient should receive attention. A large dose of radium produces a severe reaction, and patients in poor physical condition should be placed in a hospital and be given suitable treatment before a radium application is undertaken; thus, acidosis should be relieved, anemia overcome, infections removed, etc. Patients with acute infections, such as salpingitis, etc., should not be irradiated. As reported in the literature, the common cause of death in irradiated cases is infection.

Much encouragement and satisfaction however, are derived from the treatment of carefully selected patients

with radium; in many instances this type of therapy is much safer and much more satisfactory than surgical procedures. In epithelioma of the eyelid the growth may be completely removed without resulting deformity. Formerly, the surgeon could offer no hope in inoperable carcinoma of the cervix. Since radium therapy has reached its present state of development, 16 per cent of five-year cures have been obtained in these unfortunate patients, and in those not cured, symptoms have been relieved and life prolonged. Many surgeons have given up radical hysterectomies entirely and treat all cases with radium. Lymphosarcomas of the neck, treated surgically, give 100 per cent mortality, while with radium the tumor melts away almost over night, and if no metastases are present at the time of treatment, life will frequently be prolonged beyond the five-year period. In intramural fibroids becoming submucous where bleeding has reduced the hemoglobin to such a low percentage that operation would be dangerous, the results of radium therapy are excellent; much better than x-ray because the action of the x-ray is too slow. In metropathic bleeding of unknown pathology, radium is a specific and here the results obtained approximate 100 per cent of cures.

In malignancy or fibroids associated with diabetes, cardiovascular disease, pulmonary tbc., etc., where surgery is contraindicated, radium finds another useful field.

Epitheliomata of the face are best treated with 30 to 50 mg. radium element screened only with adhesive plaster placed one cm. from the lesion, kept in position four to eight hours and repeated if necessary. If the neoplasm is on the eyelid, the conjunctiva must be protected by the interposition of lead or gold. Further, as compared with surgery, radium leaves no scar provided no ulceration exists at the time of treatment. Lymphosarcoma of the neck is treated with a radium pack, the needles screened with brass or platinum and rubber, 2000 to 4000 mg. hours are used, according to the size of the tumor.

Carcinoma of the lip is treated by cross-firing; 50 to 100 mg. of the element externally properly screened, and the same amount, properly screened, internally. Some discussion may arise as to whether surgery or radium is the better treatment for this neoplasm. My own preference is for radium, especially in the early cases, treating metastases to the glands of the neck later, if the necessity arises. It is

much easier to convince patients to submit to radiation than it is to induce them to have an operation.

In carcinoma of the tongue the writer prefers a combination of thermo-electric coagulation and radium needles or seeds. The growth is first removed with thermo-electric coagulation, then the needles or seeds are implanted in the stump; the same treatment is applicable to carcinoma of the buccal cavity.

CARCINOMA OF THE CERVIX UTERI

Many methods have been used, viz: (1) one massive dose; (2) repeated doses of 1200 mg. or more; (3) continued crossfiring over a period of five or six days. The treatment will vary to some extent according to the stage in which the carcinoma is seen. Early and borderline growths give the most favorable results. In advanced or inoperable cases with involvement of the parametrium, there may be some doubt as to whether irradiation should be attempted at all. In this connection Schmitz (9) states "that advanced cases should not be subjected to either radiological or surgical treatment." In cases not too far advanced, with the help of the X-ray, some favorable results have been observed, although Heyman reports 16.6 per cent of five-year cures in inoperable cases, with radium alone.

Advocates of the single massive dose report good results, but my personal preference is for one of the following methods: viz: (1) the method of Heyman and (2) the method of Regaud.

The method of Heyman is as follows:

- (a) dilatation of the cervix and curettage.
- (b) specimen taken for microscopic examination.
- (c) application of 40 or more mg. radium element in the cervical canal.
- (d) application of 70 or more mg. radium element to the external os for 20 to 24 hours. Repetition of this dosage one week and again three weeks later.

The method of Regaud, consists of placing two tubes each containing 6 mg. + of radium element in the uterus in tandem formation 6 mg. + in each lateral vaginal fornix and 13 mg. + against the cervix latterly. The radium is removed once daily for cleansing and replaced, but is kept in position for five or six days, so that the patient receives a total of approximately 6600 mg. hours. If the parametrium is involved X-ray is used externally.

Clark advocates a trachelectomy with the cautery in all cases of carcinoma of the cervix to be followed by the application of radium and in his hands better results have been secured than where radium was used without this procedure.

It might be interesting here to compare results obtained by radium with those secured by radical hysterectomy in cases of carcinoma of the cervix, basing the comparisons upon five-year cures in both instances. I append the following tables:

TABLE 1

Author	Cancer of Uterine Cervix—Radical Hysterectomy—Absolute Cure (without deductions) after Heyman		
	Number of Cases	Number Cured	Absolute Results %
Wilson	386	26	6.7
Wertheim	979	186	19
Mayer	545	107	19.6
Thaler	917	154	16.8
Von Jasche	121	25	20.7
Thorn	225	42	18.7
Lahrhardt	325	27	8.3
Staudé	93	17	18.3
Kroenig-Freiburg	117	4	3.4
Stoeckel	350	86	24.6
Doederlein	265	54	20.4
Zweifel	435	120	27.6
Bonney	160	39	24.4
Schmidt	53	14	26.4
Franz (Jena)	120	33	27.5
Franz (Berlin)	143	40	28
Bumm	234	67	28.6
Davis	46	8	17.4
Kroenig	79	19	24.1
Average in Clinics with 200 cases or more	5,024	905	18.7

Thus we have the surgical statistics from twenty clinics, from which the following conclusions may be drawn:

Total number of operations	5,024
Total number of five-year cures	905
Percentage of cures (all cases)	18.7%

And in addition, the following are given by the same author:

Total number of operations, classes I and II	3,659
Total number of five-year cures, classes I and II	35.6%
Operability	43.0%
Primary mortality	17.2%

Heyman has collected the following statistics showing the five-year results with radium therapy from seventeen clinics:

TABLE 2

Author	Carcinoma of Uterine Cervix—Five-Year Results with Radiological Treatment		
	Number of Cases	Recoveries	%
Schulte	198	28	14.1
Kehler	129	36	27.9
Regaud	201	25	12.4
Doederlein	1,058	142	13.3
Kroeing	76	6	7.9
Menge	203	51	25.1
Heyman	500	112	22.4
Ward & Farrar	76	17	22.4
Healey	155	14	9
Wintz	415	71	17.1
Schmitz	103	15	14.5
Schwartz	49	4	8.2
Clarke & Block	144	15	10.4
Seitz	58	12	20.7
Adler	58	14	24
Muhlman	31	5	16.1
Winter	48	4	8.3
	3,512	571	16.3

The majority of the cases have been treated with radium or radium and X-ray. Wintz prefers X-ray only. Two-thirds of cases treated were inoperable.

DEDUCTIONS

Total number of cases treated	3,512
Total number of five-year cures	571
Percentage of five-year cures	16.3%

And in addition, the following:

Total number of cases—classes I and II.....	960
Total number of five-year cures—classes I and II.....	335
Percentage of five-year cures—classes I and II.....	34.9%
Operability.....	30 %
Primary mortality.....	2 %

It will be noted that two-thirds of these cases were inoperable, or to be exact 70 per cent; also no deductions have been made for patients untraceable, or those dying from causes other than cancer. An important point noticeable in comparing these tables, is, the difference in the operability rate; while the operability rate may differ with different surgeons or radiologists, it is highly significant that in the surgical cases the average rate was 43 per cent, while that in the radiological series was 30 per cent. This suggests the thought that perhaps a larger percentage of hopeless cases applied for radium treatment, because of a desire to avoid an operation. Aside from this point the comparison is as follows:

Total number of operations.....	5,024
Total number of radium treatments.....	3,512
Total number of five-year cures by surgery.....	18.7%
Total number of five-year cures by radium.....	16.3%
Total number of five-year cures—classes I and II—surgery.....	35.6%
Total number of five-year cures—classes I and II—radium.....	34.9%
Primary mortality surgical cases.....	17.2%
Primary mortality radium cases.....	2 %

A very favorable comparison, insofar as the end results are concerned, but one must take into consideration the length of confinement in the hospital, the morbidity, and the difference in mortality rates. When one considers these factors, the evidence is all in favor of irradiation. It might be well to present statistics of radiological treatment at three different stages of the disease viz: the operable, the borderline, and the inoperable.

TABLE 3

Showing net five-year survival rates after radiological treatment according to the stage of the disease—Carcinoma of the Cervix—(Lane-Claypon—1927)					
Stage of Disease	Method Used	Cases Treated	Number Alive	Net Survival %	
Operable	Radium only.....	364	152	41.75	
	X-ray and Radium.....	114	47	41.2	
Borderline	Radium only.....	387	110	28.4	
	X-ray and Radium.....	149	39	26.2	
Inoperable	Radium only.....	904	114	12.6	
	X-ray and Radium.....	337	36	9.5	
Total	Total.....	2,255	498		

This table reveals that equally good results may be obtained with radium if the cases are received sufficiently early and secondly that the results, obtained with radium only, are superior to those secured with a combination of X-rays and radium.

For carcinoma of the cervix, my own statistics are as follows:

TABLE 4

Group 1—Early cases.
6 cases without recurrence 1-5 years.

TABLE 5

Group 2—Borderline cases.
11 patients. Three in which hysterectomy was performed following irradiation. Eight in which there has been no recurrence in 1½ to 5 years. All 11 have been traced and are living and well at the time of writing this paper.

Inoperable Cases. In this group the writer has been less fortunate, only 4 out of 30 were seen sufficiently early for effective irradiation.

TABLE 6

Inoperable cases of Carcinoma of the Cervix

30 patients.
4 too recent for tabulation.
7 unable to trace.
Leaving 19 cases for study.
1 living without recurrence after 5 years.
1 living without recurrence after 24 months.
1 living without recurrence after 22 months.
1 living without recurrence after 18 months.
Others lived from 9 to 30 months.

TABLE 7

Summary Author's Cases

Carcinoma Cervix Uteri Treated with Radium Only	
Group 1—Operable.....	6 cases
Group 2—Borderline.....	11 cases
Group 3—Inoperable.....	30 cases
Total.....	47 cases
Percentage operability, including borderline.....	36.17%
Living 1 to 5 years, 21 or.....	44.7 %

UTERINE FIBROIDS

As stated above, only intramural fibroids should be irradiated and these should not exceed in size a four months' pregnancy, and further, the patient treated should be in her menopausal years.

Clark and Norris give the following as contraindications to the use of radium, in this type of neoplastic disease.

- (1) Cases in which doubt exists as to the accuracy of diagnosis.
- (2) The presence of intraperitoneal lesions other than myomas requiring surgical intervention.
- (3) Rapid growth.
- (4) Fundal carcinoma.
- (5) Pressure symptoms.
- (6) Softening or degeneration of the tumor.
- (7) Inflammatory lesions of the adnexa.
- (8) Submucous tumors.
- (9) Young patients.
- (10) Marked anemia out of proportion to the symptoms or clinical findings.
- (11) Obstructing tumors or malformations which prevent the proper application of radium.
- (12) Radiophobia.

Thus it will be seen that myoma cases must be carefully selected in order to insure good results. The tumor disappears slowly, requiring months or even years, but the results in selected cases are excellent. Howard Kelly has said, "He who would give his patient the same consideration he would his wife or sister, must place radium first in the treatment of fibroid tumors." When we compare the mortality of hysterectomy (2 to 5 per cent) with radium therapy which is 0.18 per cent, and consider the excellent results obtained by the latter in selected cases, there is little doubt as to the best method of treatment.

The effect of radium upon the fibroid uterus is primarily on the blood vessels of

the endometrium, causing an endarteritis, and secondarily on the ovaries. Twelve hundred to twenty-four hundred mg. hours, using two tubes containing 50 mg. each, in tandem formation, will usually produce permanent amenorrhoea, with reduction in size of the tumor.

The patient may have one or occasionally two periods following irradiation, depending, to some extent, upon the proximity of the application to the menstrual epoch. If the radium is introduced immediately following a period, the likelihood of that patient having another period is small. In rare instances the treatment may require repetition and occasionally a patient of this group may need a myomectomy, but this is unusual. (In my series, 1 in 32 required hysterectomy). In women of the child-bearing age myomectomy is the treatment of choice, for radiation in young women should be done with great caution.

The author has treated 33 fibroids with the following results:

Unable to trace	1
Hysterectomy required in	1
Mistaken diagnosis in	1 (Ovarian fibroma)

leaving 30 cases for study.

Of these, twenty-seven had no period, and one had two periods. All but one have recently been examined by the writer and all of the twenty-seven have shown uterus reduced in size; in eighteen the uterus is now of normal size.

A statistical comparison of the results obtained by radium and surgical procedure follows:

TABLE 6

Clark and Norris, radium alone	476 cases
Cure in 96%. 3.7% required operation—no mortality.	
Taussig 1,100 cases (Collected) Cure in 95.5%—no mortality.	
Hysterectomy—	
Deaver	750 cases
Hildebrandt	195 cases
Wachenfeld	225 cases
Tracy	100 cases
Moeller	700 cases
Ott	480 cases
Hewitt	100 cases
Total	2,550 cases
	average mortality 2.24%
Myomectomy—	
Mayo Clinic	750 cases
Bonney	100 cases
Hewitt	22 cases
Total	872 cases
	average mortality 0.87%

The treatment of uterine insufficiency is similar to that of fibroids and the dosage is approximately the same. The writer's experience with the treatment of metropathic bleeding of unknown origin is limited to 18 cases and his results are as follows:

TABLE NO. 7

Metropathic Bleeding of Unknown Origin	
2 unable to trace.	
In 2 no symptoms after 6 years.	
In 2 no symptoms after 5 years.	
18 cases:	
In 7 no symptoms after 4 years.	

In 1 no symptoms after 3 years.
In 1 no symptoms after 2 years.
In 2 no symptoms after 1 year.
1 case given 600 mg. hours radium three years ago has recently been delivered of a healthy baby.

The writer has used radium in a wide variety of cases as shown in the following table:

TABLE NO. 8

1 carcinoma of the clitoris—	recurrence after 5 years.
1 carcinoma of the vulva—	no recurrence after 3 years.
1 carcinoma of the vagina—	no recurrence after 3 years.
1 carcinoma of the nose—	no recurrence after 2 years.
1 carcinoma of the oesophagus—	died after three months.
2 carcinoma of the breast—	recurrent—lived 14 mo.—15 mo.
1 epithelioma of the face—	no recurrence after 5 years.
1 epithelioma of the face—	no recurrence after 3 years.
1 epithelioma of the face—	no recurrence after 2 years.
1 carcinoma of the lip—	no recurrence after 5 years.
1 carcinoma of the tongue—	no recurrence after 5 years.
1 carcinoma of the tonsil and pharynx	died after 8 months.
1 carcinoma of the Buccal cavity—	no recurrence after 1½ yrs.
1 carcinoma of the Buccal cavity—	died after 2 years.
1 carcinoma of the eyelid (advanced)	died after 2 years.
1 carcinoma of the eyelid—	no recurrence after 2 years.
1 carcinoma of the lower jaw and buccal cavity—	no recurrence after 1½ years.
1 lympho-sarcoma of the neck—	no recurrence after 4 years.
1 lympho-sarcoma of the neck—	lived three years without recurrence and died of pneumonia.
1 sarcoma of the ear—	no recurrence after 4 years.
3 carcinoma corpus uteri—	no recurrence after 3 yrs. in 2 cases.
1 died after 2 years—cause unable to determine.	
1 sarcoma of the pubic ramus—	no recurrence after 5 years.
1 epithelioma of the skin over mastoid—	no recurrence after 5 years.
1 sarcoma of the femur —	died after amputation by another surgeon.
1 exophthalmic goiter—L. & W. after 6 years.	

SUMMARY

It is no longer necessary to do a hysterectomy for carcinoma of the cervix. The Wertheim operation, or any other type of radical hysterectomy, carries too high a primary mortality to justify its use when equally good, if not better, results may be obtained with radium with its low primary mortality and its lower morbidity.

(2) In intramural fibroids in women of menopausal years radium is the treatment "par excellence". In other myomata complicated by diabetes, pulmonary tuberculosis or cardiovascular disease, radium may be used.

(3) In metropathic bleeding at the menopause due to uterine insufficiency metritis, or fibrosis, radium acts as a specific.

(4) In lymphosarcoma of the neck without metastases radium is the treatment of choice.

(5) In epitheliomata radium produces better results than surgery.

(6) In carcinoma of the tongue or buccal cavity thermo-electric coagulation, followed by implantation of radium needles or seeds, gives good results.

(7) In carcinoma of the lip there may be some discussion as to whether radium or surgery should be used, but the ureter's preference is for radium.

(8) And finally it is the author's opinion that radium should constitute a part

of every surgeon's equipment and should be considered an adjunct to, rather than a competitor of surgery.

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DISCUSSION

Dr. W. R. Clinton: Dr. Hewitt spoke about Dr. Regaud's technic—how much atresia of the vagina follows the treatment?

Regarding X-ray treatment combined with radium in the inoperable cases, there is usually marked toxemia; the patients have severe nausea, vomiting and diarrhoea and lose resistance which they never recover. The majority of our cases did not die of liver metastasis but died of uremia due to obstruction of the ureters in secondary glands at the brim of the pelvis. Radium, we think, is the best treatment for carcinoma of the cervix but we must extend our statistics longer than the five-year period. We had two patients in 1916 on whom we performed hysterectomies followed with radium treatment, who have died—one in 1926 and one recently from metastatic carcinoma.

Dr. J. P. Pratt: This valuable paper merits considerable discussion. I want to state briefly our reason for treating cancer of the cervix by radium, later hysterectomy, and still later deep X-ray therapy. Dr. Stevens has just spoken of the classification of cancer of the cervix with reference to the type of cell. He emphasized that these various types show a different susceptibility to radiotherapy. A few years ago a patient came to this city from a clinic where cancer of the cervix is treated by radium exclusively. She had been told that sufficient radium had been given. However, we performed a hysterectomy. When the specimen was examined cancer cells were still present, some of which showed mitotic figures. The nests of cells were surrounded by considerable fibrous tissue, but even so, they were a potential source of danger. Two other such experiences have led us to believe that it is difficult to determine the exact amount of radium required in all cases. Therefore, a simple hysterectomy offers another factor of safety.

Dr. S. E. Sanderson: Three therapeutic methods must always come in for consideration when a

patient with carcinoma of the uterus presents herself to the physician, surgery, X-ray, radium. In various clinics, choice in procedure will usually follow maximum skill in the method or combination of the methods chosen. The skill of the physician may determine the method. In the early days of surgery for appendicitis, Ochsner (Chicago) said, "If you have a good surgeon, let him operate. If not, use ice and trust to God."

Some of the German clinics which were formerly surgical are using deep X-ray therapy in their cases of cancer of the uterus, followed by panhysterectomy. In many of these cases proven before operation by biopsy to be malignant, the tissues taken out at operation fail to show any cancer cells; which proves in these cases deep X-ray therapy has destroyed the local malignancy. Surgery in this connection should be used only in expert hands.

Between X-ray and radium the chief difference is one of therapeutic localization. The X-ray has a wider range and is useful in holding back metastasis while radium may conveniently be placed next the malignant growth or imbedded in it. In either event use enough; small doses are disastrous. One would know his dose and use enough. I believe this cannot be stressed too frequently.

Dr. R. H. Stevens: I should like to say just a word in regard to the treatment of cancer of the cervix. Dr. Hewitt has presented quite an array of statistics of more or less value in showing the general trend of experience in the large clinics in radiation and surgical treatment of cancer of the uterus. Some statistics of surgery in early cases are fairly good and others very bad. The trouble is most of the statistics are based on insufficient and inaccurate details concerning the type of cancer that has been dealt with when selecting the method of treatment. Then, too, the technic of radiation treatment has varied a great deal.

Dr. Hewitt stated the well-known fact that cancer cells are more sensitive to radiation at or near the time of division. It is also known that certain types of cells are more radio-sensitive than other types, though there are exceptions to this rule.

In a general way the adult more highly differentiated cell is less radiosensitive than the less differentiated or more anaplastic type. As Broders has shown, the less the differentiation in the cell the higher the malignancy, the more the tendency to metastasize; and Regaud and his school have demonstrated that the higher the grade of malignancy the more radiosensitive it is. Martzloff's grading corresponds with Broders fairly well, though the former has three grades and the latter four. For comparative statistical purposes Broders grade 1 and 2 might be put together and his 3 and 4 compared with Martzloff's 2 and 3 as Healy has done. Then if we deal with three grades only we might select the treatment somewhat on this basis, namely, Grade 1 (Broders and Martzloff) which is not common and in which the adult, more highly differentiated type of cell greatly predominates, is a local growth when early, has not the tendency to metastasize and is consequently much more benign. Early growths of this type give the high percentage of five-year cures from surgery.

Grade 2 (Martzloff and including Broders 2 and 3) is much more common and is quite malignant; is much more radiosensitive and much less amenable to surgery.

Grade 3 (Martzloff and Broders 3) is most

malignant, almost 100% fatal with surgery and 40% to 60% curable for five years with radiation.

They should not therefore ever be operated but should be left to radiation.

Therefore, it is important to first secure a section and grade it before beginning treatment. But here we meet with some difficulties too, for Martzloff has shown that only about one-third of the biopsies made correspond accurately with sections made from the whole uterus when it is removed later.

We are devotees of Regaud's technic in radiation treatment, some of the points of which are as follows:

1. Care in preparation of the patient to remove as much infection in the vagina and cervix as possible before radiation, as infection makes for radio-resistance.

2. The use of radium heavily filtered through platinum over a long period of time in order to radiate all the cells during their period of mitoses when they are more susceptible.

3. The addition of deep X-ray therapy to radiate parts of the pelvis not sufficiently radiated by the uterine and vaginal radium applications.

Dr. Alexander Campbell (Grand Rapids): I want to express my appreciation of the opportunity of hearing and discussing Dr. Hewitt's very excellent paper and have tried to select four or five of the most important points that I believe he desired to set forth in his presentation.

The main one is that so far as we have knowledge of the treatment of cancer of the cervix, radium properly administered is preferable to surgery in practically every case where any treatment is indicated.

Dr. Hewitt's reasons for this opinion are based on the fact that surgery has a high primary mortality, approximately 17 per cent. A high percentage of the cases following surgery die within the first year.

Radium has a minimum mortality less than 25 per cent, and the five year cures following radium show almost as high a percentage as that following surgery.

I believe, however, that occasionally a very early case who is a good operative risk may have a better result from radical surgery, and by radical surgery I mean, a panhysterectomy, wide removal of one-third or one-half of the proximal portion of the vagina, dissection of the parametrium and the removal of the invaded glands. If surgery is resorted to it should be the most thorough and radical type of surgery and I believe that many operations for cancer of the cervix are being performed which are not sufficiently radical and which are, therefore, harmful to the patient.

The patient who is to be treated with radium for carcinoma of the cervix should receive very careful pre-operative care, in fact the same care as if she were to be submitted to radical surgery.

A test for renal function should be made and a blood transfusion is frequently indicated.

Following an irradiation the patient should be either gotten out of bed very soon or placed in a posture favorable for genital drainage.

Dr. Ward of the Woman's Hospital of New York City advises a very careful follow up of

all his patients treated with radium and makes a gynecological and speculum examination every month. I desire to accentuate the importance of this follow-up system.

Concerning fibroids I believe that the majority of cases should be treated by surgery, the mortality from which is minimum as shown by Dr. Hewitt's personal records and by the statistics which he has shown from the work in other clinics.

I want to make a plea for the safe-guarding of the child-bearing function in women and to bring out the fact that children born of women who have received radium treatment have a tendency to malformation, mental deficiency and other abnormalities, therefore, I feel that surgery is preferable to radium in the management of most fibroids that require treatment.

I believe that myomectomy is a very valuable procedure in many cases of fibroids of the uterus, and all obstetricians of experience know that many children have been born following myomectomy.

Concerning the so-called functional uterine bleeding in women, I agree with Dr. Hewitt that radium appears to have achieved its greatest success, however, in my own personal experience, I have had to perform hysterectomy in some cases where radium failed.

The very extensive and comprehensive statistics which were shown by Dr. Hewitt are to me a little confusing but I am sure that he has succeeded in establishing the fact that at the present time radium is the modality of choice in the treatment of cancer of the cervix, because of the low mortality which attends it, because of the minimum amount of discomfort it causes the patient and because the latest statistics indicate that it will prolong the lives of the unfortunate victims with as much certainty as can be accomplished with the most radical surgery.

Dr. Hewitt (closing the discussion): I wish to thank all the men for entering into the discussion of this paper. Dr. Campbell spoke of the surgery of fibroids. There is little question that surgery in fibroids is the best treatment before the menopause, especially myomectomy in younger women. Dr. Sanderson brought out the grading of cells. I have all that definitely written down in my paper but I didn't want to tire you by reading it all. The higher the malignancy the more susceptible is that tissue to radiation; the exact opposite to surgery. Dr. Pratt brought up the question of hysterectomy following irradiation—an important point—but in the case he mentions, I am inclined to believe his case was insufficiently irradiated. Small doses of radium will cause cancer cells to grow, rather than cause retardation of growth. The grading is very important.

Dr. Clinton's question—the difficulty of operation after radium: with cancer of the cervix, if the hysterectomy is to be done after irradiation, it should take place within three weeks, otherwise there will be many adhesions and much scar tissue.

SOME ESSENTIALS IN THE TREATMENT OF DIABETES MELLITUS

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Our object in the treatment of diabetes, as with any other disease, should be to do our patient the maximum of good with a minimum of harm. We should try to prolong his life, and make life as easy, pleasant and agreeable as it is possible for us to do. In other words we should try to make life as normal as possible. The diabetic has sufficient hardships and deprivations of his own, which we should do our utmost to minimize; we should help him to maintain his place as a functioning individual in society.

With this object as our ideal, there are several outstanding factors concerned with the proper treatment of such a case. The first essential is an adequate diet; a diet that contains a sufficient number of calories to supply the bodily needs for growth, work, and repair. Such a diet must be appetizing, wholesome, easily procured and prepared. It must meet, within reason, the patient's likes and dislikes.

The second factor is to supply sufficient insulin, either by injection or from the patient's own pancreas, to enable him to utilize this necessary amount of food. More simply stated, we must give the patient enough fuel, and we must see that he is able to burn it. Insulin may be given before one meal once a day or it may be given before each meal and a dose may also be required at midnight. It is usually given 15 minutes to a half an hour before the meal.

I have thought that cases of diabetes that were more or less resistant to insulin did better and required less insulin, when it was given at a greater interval before the meal. Insulin dosage should be taught and given in units and not by the cubic centimeter measurement on the syringe.

There are as many opinions regarding what constitutes a proper diet, as there are clinicians treating diabetes. In the main, diets fall into one of the three following classes:—First, a low carbohydrate, moderate, protein, and high fat diet, known as the Newburgh-Marsh diet. Second, the moderate carbohydrate, protein, and fat diet, known as the Woodyatt-ratio diet. Third, the high carbohydrate, moderate protein and low fat diet, known as the Joslin diet.

Each school has its adherants and until the present time no optimum diet has been evolved. If one is satisfied that his particular method observes all the requirements, it will probably be found as suitable as any that another might suggest. Every one has an occasion arise now and then, when the regime which has been followed

successfully for a time does not seem to work, and he must then modify his system to meet the individual necessities of the case.

I have been feeding diabetic patients for a great many years. I have gone through the oatmeal and the vegetable days; I have used the starvation treatment of Allen; I have used the three methods mentioned before, namely the Newberg-Marsh, Woodyatt, and Joslin diets. At the present time all my patients receive at least 60 grams of carbohydrate and more often 100 grams. They receive one gram of protein per kilogram body weight and if they are infants or children, they receive more. I give them enough fat to make up the deficiency in calories. A common formula is to give 1 gram of carbohydrate and of protein and 2 grams of fat per kilogram body weight.

The Newburgh-Marsh diet gives a ketogenic antiketogenic ratio of 1 to 2 or 3. The Woodyatt diet yields a ratio of 1 to 1.5, the Joslin diet 1 to 1. The diets at present in use in the clinic and in the hospital show a ratio of glucose 1 to fatty acid 1.25. The ratio method of feeding diabetic patients rests on very little positive laboratory evidence, and is not accepted by many clinicians as proven. While I do not hold strictly to this technic, most of my diets would give this ratio if computed according to the Woodyatt formula.

I have fully convinced myself that it is impossible to satisfy an individual, be he either youth or adult, with less than 60 grams of carbohydrate a day. More frequently it requires 70 or 80 grams to meet all their requirements. I have fed many children and adults on from 30 to 40 grams of carbohydrate per day, and have later found that they were sucking the honey out of clover or eating toothpaste and mucilage or anything to make up the deficiency of carbohydrates, whereas the adult would pilfer the ice-box at night or other patients' trays in the hospital, for the same reason.

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Consequently the blood sugar and urinary sugar would fluctuate so that an accurate estimation could not be determined. Whereas, if patients are given an adequate carbohydrate allowance, they are happier and more contented, they will co-operate better, and the blood sugar and urinary findings are more easily maintained at a constant level. Insulin may have to be used to obtain these results. I do not hesitate to use it when it is necessary; it is one thing to prescribe what you may think is a proper diet, but it is quite another thing to get patients to follow it constantly, willingly, and cheerfully from day to day and month after month. You must take into consideration the likes and dislikes of your patient and his ability to purchase and obtain the foods you prescribe, if you expect him to co-operate with you cheerfully.

The protein requirements for an adult patient who is active are at least 1 gram per kilogram of body weight. The amount must sometimes be increased to $1\frac{1}{4}$ grams to keep them in nitrogen equilibrium, while to children we frequently give two, three, or four grams according to age. It has been shown that for experimental purposes, a patient may be kept in nitrogen balance on $2/3$ to $3/4$ gram of protein per kilogram weight, but this amount of protein is not practical for patients who select their own diets and are at all active or attempt to do some work.

It was sometimes difficult to know how many calories and how much protein to feed diabetic children until I established the following table, which seems to answer all purposes:—

Age	Calories per day	Grams Protein per kilo body weight
1	100	4
2	90	3.5
4	80	3
6	70	3
8	60	2.5
10	50	2
12	50	1.5
14	50	1.5

After the age of sixteen years, the children are fed the same as adults, with but few exceptions.

The Americans are a carbohydrate and protein eating people. Very seldom from choice do they eat large quantities of fat. Most of us cannot tolerate an excessively high fat diet over any great length of time. The diabetic whose carbohydrate is limited to one-half and frequently to less than one-third the amount a normal person consumes, must make up this deficiency in calories from fat, but to give them more fat than is necessary to make up this deficiency is unwise and not well tolerated by

the individuals for any great length of time.

I believe it requires larger doses of insulin to feed a high fat diet and that acidosis supervenes more easily. Joslin in the last edition of his text book says, "A high fat diet is as innimical to the diabetic as it is to the normals. A high fat diet in the modern treatment of epilepsy causes hyperglycemia, and acidosis," and he cautions us not to make the fat too high or the carbohydrate too low. Strike a balance. Do not treat the diabetic like an epileptic on the one hand, or like a normal individual on the other. As for protein, use discretion. (Page 103).

"Arteriosclerosis is one of the most troublesome complications of diabetes, today. It has supplanted coma as a cause of death in diabetes."

Arteriosclerosis is due to faulty metabolism and to the deposit of fat in the form of cholesterol esters in the arteries. The more fat there is in the blood, the more readily is it deposited. The subsequent calcification of the deposited cholesterol leads to calcified arteries.

Arteriosclerosis is present in 63 per cent of diabetic patients above the age of 40, and in only 28 per cent of non-diabetic patients of similar age. It seems to vary with the duration of the disease and the neglect of the treatment, because it was not observed in cases of long standing when the disease was controlled.

Protein is acknowledged to favor, rather than to prevent, the onset of arteriosclerosis and no one approves of increasing the protein above the usual standard of 1 gram per kilogram body weight in the diet of an individual who is developing arteriosclerosis.

Carbohydrate, if taken in excess so as to produce obesity, also favors the development of arteriosclerosis, but is the food par excellence which we can give all arteriosclerotics, especially those with a localized disease in the heart, kidneys, and extremities. Only as much should be given as can be burned without causing hyperglycemia, because this hyperglycemia is an abnormal condition and any abnormal condition will tend to wear out the machine.

Any diet that is prescribed must be such that it will supply sufficient energy to the body to enable metabolism to be carried on in a normal manner. The energy required is to be calculated in calories. It is determined by several factors: age, height, weight (underweight or overweight), and the activity of the patient. We consider it

preferable that the average diabetic be kept a little underweight. He must have a sufficient number of calories to carry on comfortably or he will become dissatisfied and will refuse to follow dietary instructions.

The calories obtained from carbohydrates should supply enough energy for muscular work, the protein should give sufficient strength so that he does not complain of weakness, while the fat must furnish the heat and also make up for any deficiency not covered by the carbohydrate and protein.

We usually consider that the conditions are satisfied when the calories per kilogram of body weight in an adult are within the limits of 20 to 35 calories. To young children we give more. The amount can be varied as experience with the case seems to indicate. After placing a patient on a diet that has been calculated for him, if it is found that he shows sugar in the urine, we know that his pancreas will not allow him to utilize a proper diet, and as he can not supply enough of his own insulin, we will have to supply it for him.

I have often said that I believed more insulin was used unnecessarily than is used necessarily. I am led to this belief when I hear of the number of patients who are going to physicians' offices to receive a dose of insulin two or three times a week. When I see the number of obese patients taking insulin and when I see the number that are taking it irregularly to tide them over a carbohydrate spree, it leads me to believe that a tremendous amount of perfectly good insulin is being wasted.

Any one who can get along by taking insulin less than once a day, does not need it at all, and should be managed by diet alone. Very seldom is it necessary to give insulin to an obese patient unless he has an infection, and then it is only a temporary expedient, which is to be discontinued when the need has passed.

To give insulin to patients so they may eat unnecessarily large amounts of carbohydrates only brings discredit to a most useful drug and dissatisfaction to the patients. Finally, to the physician who prescribes it in this way, Joslin says, "Insulin is a remedy for the wise and not for the foolish, be they patients or doctors. Every one knows that it requires brains to live long with diabetes, but to use insulin successfully requires more brains."

In an uncomplicated case, insulin is usually not given immediately to get the urine sugar free; ordinarily these patients are

first placed upon a fasting period of 24 to 36 hours, during which time they may have clear tea, coffee, broth, and water ad lib. In this interval the dietary requirements are calculated, and the physical examination is made. They are then placed on a sub-total diet. It is surprising how many patients will become sugar free if this method is given trial. If the urine is not sugar free after a few days of such management, insulin administration must be instituted.

Large doses of insulin are not as a rule necessary. Many patients taking one large dose of insulin before breakfast and only once a day, can get along with a less total amount, by dividing the dose and giving it twice a day. Insulin that is not used is wasted. Joslin says that "patients taking large doses of insulin are walking stilts and their equilibrium is not as secure." Most of the injections are given twice a day, usually before breakfast and supper. Some severe diabetics require it before each meal and children often require a dose after midnight so that they will have a lower blood sugar in the morning. We try to keep the single dose as low as possible, for we have found that the larger the single dose, the less effective will be the single unit of insulin; and the more frequent the injections, the lower will be the total amount required in twenty-four hours.

Insulin is absorbed and used in the body at a certain definite rate. When excessive doses are given, it is not absorbed to be utilized in the tissues, but is eliminated by the kidneys. Evidence of this is shown by injecting the urine of individuals taking large doses of insulin into rabbits, which produced symptoms of hyperglycemia and low blood sugar readings. The dangers of using insulin have been overestimated. I have seen but three deaths from hypoglycemia. In each instance the insulin was repeated in increasing doses when the patient was already manifesting signs of hypoglycemia. Insulin when properly used is devoid of any dangers. It does not aggravate any complications of the disease, e. g. tuberculosis, pneumonia, heart disease or any of the acute infectious diseases.

The primary reason for avoiding its unnecessary use is the inconvenience of hypodermic administration and the added care necessary in proportioning the diet to the dose of insulin. Diets must be proportioned and weighed more accurately when insulin is being given than when the management is by diet alone.

Insulin should be used freely as a preventive of systemic infections, when dealing with cases of gangrene. Children require insulin more frequently than adults, and it may be advisable at times to give it to them on the supposition that it may provide a rest to the pancreas, in spite of the fact that there is but little evidence of the regeneration of the pancreatic function when it has once been lost. I have never seen an increased tolerance manifest itself from the use of insulin alone, although we do see great improvements from the combined use of diet and insulin, or even diet alone.

CONCLUSIONS

It has been shown that the diet must be of sufficient calories to allow the patient to do the amount of work he is expected to do.

That the diet must be of such as he can procure, eat and digest with satisfaction to himself and his physician.

That insulin should not be given un-

necessarily to obese and overweight patients.

That insulin should be given in sufficient amounts and at times when most needed either before or after the meal and at midnight when necessary to keep the blood sugar level and the urine constantly free of sugar.

That large single massive doses of insulin are not as effectual as small more frequently repeated doses.

That it is not advisable or necessary to feed patients less than 60 grams of carbohydrate a day.

That at least one gram of protein per kilogram body weight should be given except for definite reasons or for experimental purposes.

That it requires larger doses of insulin to feed a very high fat diet.

That excessive quantities of fat in a diabetic diet is apt to make the existing arteriosclerosis worse.

CLINICAL SIGNIFICANCE OF CARDIAC ASTHMA

In a group of 250 patients with cardiac asthma discovered in the past few years among 3,100 private and hospital patients with organic heart disease (8 per cent), and analyzed by R. S. Palmer and P. D. White, Boston, 180 were males and 70 females, and all but 14 were over 40 years of age. The grave prognostic significance of the condition is shown by the fact that 170 of the 250 patients are known to have died, with an average duration of life of 1.4 years after the first attack of cardiac asthma. The largest number of cases, 187, was found in the group of patients with coronary disease, hypertension, or both (10.7 per cent of this etiologic group), but the highest relative incidence occurred in syphilitic heart disease (21 per cent) and in chronic nephritis (19 per cent). Left ven-

tricular failure due to any one or a combination of several factors appears responsible for cardiac asthma, but the exact mechanism is not clear. The frequency, duration and severity of the attacks altered the prognosis appreciably only when of extreme degree. The coincidence of poor heart sounds, gallop rhythm and pulsus alternans indicates, as a rule, a very short life. Aortic regurgitation, usually of syphilitic origin, was the only common valve defect (63 cases of the 250). In therapy, digitalis and rest were generally effective in reducing the number of attacks and apparently in prolonging life; for the treatment of acute attacks nitrites and alcohol were sometimes helpful, but morphine was of the greatest value.
—Journal A. M. A.

EPIDEMIC OF TRICHINOSIS

In an epidemic of forty-three cases of trichinosis due to trichinous pork reported on by Edward P. McDonald and Kenneth C. Waddell, Albany, N. Y., the predominating symptoms were: muscle and joint pains in twenty-two; edema of the face in nine; generalized edema in two; general fatigue in nine; cough in seven; severe headache in two; vomiting in two; chills in one; furuncles in one; marked hoarseness in one; lobar pneumonia in one, and broncho-pneumonia in one. Eight of the patients did not present any symptoms. The treatment should consist of rest in bed; the free administration of fluids; a high caloric diet, and 2 grains (0.13 Gm.) of mild mercurous chloride given in divided doses with a morning saline cathartic, to be repeated once after three days. Colonic irrigations should be given together with such symptomatic treatment as may be indicated. Clinical data should include a complete blood count; urinalysis; chemical analysis of the blood; stool and spinal fluid examinations, and biopsy of

excised section of muscle. McDonald and Waddell state that the majority of cases showed an eosinophilia with a relatively low percentage of neutrophils and a high percentage of lymphocytes and leucocytosis. In patients with a complicating infection, such as pneumonia, the blood picture may be markedly altered with an absence of eosinophilia. With few exceptions, cases go on to chronicity. All persons who eat of trichinous pork need not necessarily give clinical evidence of the disease. Although patients with cerebral symptoms and signs may show the parasites in the spinal fluid—parasites are not consistently present. No known remedy is specific. Drastic catharsis early in the infection is beneficial, as it aids in ridding the intestinal tract of parasites. The blood sugar was low in all patients, which may be accounted for theoretically; either because of the presence of myositis, glycogen storage was impaired, or, because of muscle involvement, sugar consumption was increased.—Journal A. M. A.

SOME PROBLEMS CONNECTED WITH CANCER*

REUBEN PETERSON, M. D.**

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I have just returned from a four months' vacation and have had no time to prepare a formal paper on the subject assigned to me by your secretary. However, the subject of cancer, no matter where situated, is so important that one should always be glad to discuss it.

The main characteristic of the cancer question at the present time is the discouragement existing regarding the treatment of the disease, both among our own profession and the laity. Too many doctors and far too many people believe there is no cure for cancer—that the patient with the disease in whatever location is doomed. The patient, who notices a suspicious lump, all too often fails to consult a physician because he or she thinks it cancer and incurable and that death is inevitable in the same horrible form in which many of their relatives and friends have died from the same disease.

In the case of the practitioner who meets with two or three cases of cancer in the course of his practice in a year and sees all those patients dead within two years, it is not strange he loses heart and also thinks the disease incurable. In fact, I know of no condition where it is necessary to so whip one's courage as in the treatment of cancer.

Yet we need not be too discouraged. Looking back over nearly 40 years of practice I can see we are infinitely better off to-day in the treatment of this disease.

Let us not worry about the cause of cancer. Let us leave that to the research workers, who without doubt will find the cause some day, if there be a single cause which is open to doubt. We can say to our patients we do not know the real cause of cancer, but we do know certain conditions which favor its development. We practitioners are most interested in the early recognition of the signs and symptoms of cancer and how to cure our patients.

It is our ever-present duty to combat pessimism about the curability of cancer, for the laity take their cue from the doctor. If he says to the patient that the disease is cancer and indicates by his manner he considers it incurable, his pessimism soon permeates the atmosphere and discourages not only the particular patient, but everyone she comes in contact with and prevents these in turn from seeking advice early.

Cancer is a dreadful disease. When far advanced and not treated, it is apt to be a

loathsome disease, but this does not mean that in the beginning it was not microscopic and amenable to complete removal and cure.

That should be our text, morning, noon and night. Cancer starts in a small way and, if discovered at that time, can be completely removed with no recurrence. Watch out for the first symptoms of cancer, for then is the time to begin the cure.

I remember performing a hysterectomy for carcinoma of the fundus in the early nineties on a patient referred to me by one of the former grand old doctors of this society, Dr. G. K. Johnson of Grand Rapids. After two or three years had passed with no recurrence, the old doctor said to me one day that I had made a mistake in diagnosis and that it was not cancer because the patient was still living. He was not convinced, when told that microscopically it was demonstrated cancer. In his long years of practice he had operated upon over a hundred women for cancer of the breast with not a single cure, all dead of the disease after a certain time. Hence, he did not believe cancer could be cured by operation.

Of course, we know why good surgeons, and he was one, failed. No cancer of the breast was operated in those days in its early stages—not before the axillary glands were involved. They used to let it grow until there was no doubt it was cancer. An operation consisted in removal of the breast and leaving the cancerous axillary glands behind. The patients died, not of a recurrence, but of a continuation of the cancer. If we compare this situation with present conditions in the treatment of cancer, we see a wonderful improvement. Incomplete operations have been abandoned for radical removal of all tissues and lymph channels which are or may be affected by the disease.

When I began the practice of medicine nearly 40 years ago, cancer of the tongue, for instance, was a perfectly hopeless disease. A few bold surgeons removed

* Read before the Section on Gynecology and Obstetrics, Michigan State Medical Society, Detroit, September, 1928.

** Dr. Reuben Peterson, A. B., Harvard 1885, M. D., Harvard, 1889. Professor of Obstetrics and Gynecology, University of Michigan since 1901.

the tongue, but not the glands. The operation was not extensive enough and the disease was not arrested. Under modern surgical methods, with early diagnosis and radical operation, a very fair proportion of cures with no recurrence result.

The same may be said of cancer of the breast. Heeding the slogan, "every lump in the breast should be regarded as suspicious" cases of cancer of the breast come to the surgeon earlier than formerly. Radical removal of the breast, together with the pectoral muscles and lymph channels, hold out excellent hope of cure in over 80 per cent of the cases.

Formerly not even the boldest surgeon thought of operating upon cancer of the stomach. Now an ever-increasing percentage of cures follows partial or complete gastrectomy with removal of the regional lymph nodes.

In cancer of the uterus, the results are ever-increasingly good. This may be ascribed to the fact that the cancerous cervix, even in the earliest stages of the disease, almost always produces symptoms arousing suspicion and because the organ can be readily palpated and inspected. This is a great advance from the days when practically every patient with cancer of the cervix was doomed. Now, by radical surgical removal, and by the intelligent application of radium, from 30 to 40 per cent of cures result.

While all of the above results should cause us to be far from discouraged, there is yet much to be done. What should be done is so self-evident to the educated physician that he fails to recognize the state of mind of the average patient who reads little and thinks not at all. In the first place, it is difficult to interest the entire public in any one thing. It was done during the war in the campaign to secure funds by talks and posters. Yet with the whole country aroused and talking about "giving till it hurts", there were people who paid no attention. Like the washerwoman who cared for the needs of some of the faculty ladies of the university, when one of them said such and such a thing could not be done on account of the war, the wash lady said, "What war?" and when told it was the Great World War, replied that she was astonished that war was still going on and that she thought it had ended long ago.

Exaggeration, yes, but an explanation of a great truth that only by countless repetitions can you hammer things home to people—the great mass of the people.

Early and late our task is to tell our patients again and again, over and over, that pain is a late symptom of cancer and that they should not wait for the symptom before going to their doctor.

And again we must see to it that we, as a profession, do our duty. Some doctors are ignorant, pessimistic or careless about their advice or treatment of patients with suspicious signs of cancer. It is little short of criminal to give office treatment to a woman with a suspicious cervix until it is too late for effective treatment.

The permulgation of the true facts about the diagnosis and treatment of cancer to the medical profession will come through more thorough and systematic teaching of the undergraduate in our medical schools. The ignorant will be supplanted by the intelligent physician. It will take time, just as it has taken nearly 40 years to see the disappearance of the old-time surgeon disregardful of the principles of asepsis.

So far as the education of the public in regard to cancer, all well established methods of publicity and propaganda must be utilized. Let no false ideas about medical ethics prevent us as a profession from employing all methods of publicity shown effective in other walks of life. Let us welcome the movement to furnish health columns in the newspapers under the supervision of the leading members of this society.

As an example of what can be accomplished by newspaper and magazine publicity we have only to consider the appendicitis campaign. Forty years ago practically no one was operated upon for this disease. Now, through newspaper publicity, everyone knows the appendix is on the right side and the slightest pain there will send the patient to the doctor. We even have difficulty in preventing people from having useless operations where they have made their own diagnosis of appendicitis.

So far as the cancer problem is concerned, a great deal can be done through the State Board of Health, with its efficient commissioner, Dr. Kiefer, who is so well backed by Governor Green. The powerful agencies of this state department can do much good in spreading the gospel of the early recognition and treatment of cancer to the people of the state. Personally, I am perfectly willing to leave to the Board of Health the details of their efforts to put across an effective cancer campaign. Any and every dignified effort to save all

or a proportion of the ten people dying each day of cancer in Michigan should be welcomed by the profession of the state.

I am in favor of cancer clinics, even free cancer clinics, although I am aware the latter are looked upon somewhat askance by doctors for fear of this leading to state medicine. As chairman for Michigan for the American Society for the Control of Cancer, I tried a short time ago to establish cancer clinics throughout the state through the agency of the councillors of this society. It was only partially successful, owing to the opposition to free cancer clinics. In some places it was quite successful and many patients with cancer were undoubtedly saved. Dr. Saltzstein of Detroit, has shown what can be accomplished by wide publicity and free cancer clinics.

Years ago we were just as discouraged over pulmonary tuberculosis. Anyone with the disease was thought to be doomed. Yet the mortality of the disease has steadily been reduced by wide and intelligent organization and publicity.

The same can and will be done for cancer. Let us all get together and work to bring this about.

DISCUSSION

Dr. George (Ann Arbor): I was interested in Dr. Peterson's paper, especially about the cause of cancer. Of course, we are all interested in finding the cause of cancer if that is possible. Research workers have been busy on this subject for a good many years. In some parts of the world various workers have brought out what they thought was the parasite, or a germ, bacterium, that caused cancer.

For instance, in Chicago one surgeon thinks he has found the cause of cancer in the form of a vegetable parasite, or germ. But most pathologists disagree with this theory of cancer. They do not think that it is of an infectious nature, but rather of a pathological process that takes place in the body, under abnormal conditions, so that certain cells take on an abnormal growth, compared with their normal growth.

There are other workers in England who thought they found the germ of cancer. There the lead treatment has been used for a good many years. But, it has not been altogether successful.

Then in Germany, Schmidt of Munich thought he had discovered the germ of cancer. I think that was some 15 years ago. He first announced his discovery then. He inoculated horses with this germ and produced a serum, taking the blood of the horse after it had undergone the disease. Then he used that for inoculating patients, and besides, he made a vaccine from these germs.

For the last 15 years we have seen articles in the German medical journals on these vaccines and serums being used in inoperable cases of cancer. They found that was good on cases where nothing could be done. They were started on this treatment and fully 19 per cent of these cases have been cured. Of course, a great many

of them are not helped at all. But, if the case was put under treatment early, before all the resistance of the body was gone to combat the disease, there was some chance.

This treatment has not been recognized by the United States Public Health Service. They think that not a sufficient number of cases have been cured to warrant them in giving Schmidt a license to sell these preparations in this country. Consequently, they have furnished the vaccines and the serums to various doctors in different parts of the country and to various hospitals for trial, hoping to get enough successful cases on record so that the United States Public Health Service will finally grant them the license.

I wanted to give you the results in a series of cases I have had and you may take them for what they are worth. Of course, this is a new form of treatment and it stands or falls on its merits. I have treated about 15 cases of inoperable cancer. Of course, where the tumor is operable, it should be removed, always. But, these are cases that are beyond the help of operations. These 15 cases were treated and of them I can say there were two cases that have been helped. However, the help has been so remarkable that I desired to make a record of it before the Society.

One case was that of a woman, about 35 years of age, who has had six children. This trouble started during the last pregnancy. She began to have pus in the urine and after the baby was born the pus increased in quantity considerably so that the urine was practically filled with pus. It would hardly flow out of a small bottle. There was frequent filtration and pain in the abdomen on the right side of the pelvis and on examination I found a tumor there which seemed to involve the uterus and the right ovary. In consultation with Dr. Cumming at Ann Arbor, we decided the case was one of cancer.

We both thought it was inoperable. I had a cystoscopic examination made by Dr. Edinborough of the University hospital. When we saw the growth in the bladder, in connection with what was in the uterus, we unhesitatingly pronounced that to be cancer. There was no help except by the use of radium.

I had been reading the reports from Germany and I thought I would start the case on this treatment. That was about a year ago. In a short time the woman increased in strength and the pus began to disappear from the urine. Now, at the end of a year's time the growth has practically disappeared and cannot be palpated any more. Besides that, the kidneys have all cleared up, where she had to get up about 18 times a night. The urine is perfectly clear and there is no pus at all.

She has six children, lives on a farm and is doing all of her housework. She has made a good recovery of whatever she had.

The other was the case of a woman who was operated by Dr. Peterson two or three times. The last operation was a little over a year ago. He pronounced the case, from the pathological report, as being one of sarcoma. She was put on the same treatment and at the end of a year the growth is scarcely to be recognized and she has increased so much in strength that she is able to do her housework. She has two small children at home, lives on a farm.

These results are good. That is, however, only two cases out of fifteen. The method, of course, of the treatment has to stand on its own merits. But, even if there are just a few cases saved, those that have been inoperable, it is worth trying.

RENAL ACTINOMYCOSIS WITH PARTICULAR REFERENCE TO URINARY FINDINGS*

REPORT OF CASE**

PAULINE BEREGOFF, M. D.†

TRAVERSE CITY, MICHIGAN

Actinomycosis is no longer considered a rare disease. It is very frequently found in its different forms and manifestations. The kidneys are often found to be the seat of the lesions, but these lesions are considered of metastatic origin rather than primary. The process may arise by extension from the thorax, by metastasis or by infection the gastro-intestinal tract. The diagnosis of renal actinomycosis is at best a difficult one to make. The case here reported is of interest because of the fact that the diagnosis of this disease was made by finding the fungi in urine when the patient did not present any symptoms to warrant this infection. A careful search of the literature, including the interesting data recorded by Sanford¹ in his large collection of cases of actinomycosis, fails to disclose any case recorded where the urinary sediment determines the diagnosis. Christison and Warwick² present a case of a boy of eight years of age, where actinomycosis of the lungs with involvement of the suprarenals alone, was found. The urinary findings in their case were negative.

REPORT OF CASE

Mrs. M. B., aged 63, a farm-hand and laundress, was admitted to the General Hospital, August 6, 1928, complaining of pain in the right upper portion of the abdomen. The pain would rotate toward the posterior lumbar region and both inguinal regions. Up to two years ago patient enjoyed good health. Then she began to complain of frequent coughing spells and sore mouth. Having abscessed gums, she had all her teeth removed. Her condition improved. For the last six months previous to admission, patient complained of weakness, loss of weight and inability to do her work. Her physician told her that she was suffering from a uterine tumor and advised surgical care, for which she was referred to Dr. Swanton. A pre-operative urine specimen, examined by the technician, was reported to be of milk-like appearance, containing many hyaline and granular casts, renal cells and an abundance of pus cells. The chemical examination revealed a heavy cloud of albumin and an excess of indican. The blood showed 3,500,000 red cells, 17,000 white cells with a polymorphonuclear count of 81%. The hemoglobin was 72%.

August 7, a hysterectomy and bilateral salpingo-oophorectomy was done by Doctors Swanton and Flood, who suspected a malignant growth of the uterus. A firm interstitial tumor the size of an egg was removed. Sections of the tumor showed it to be a fibromyoma with no evidence of malignant infiltration.

The first few days after operation, patient seemed to be doing nicely. The temperature did not exceed 100 F. However, August 16, she started

to complain of pain in the right side of abdomen, was very weak, and was unable to take nourishment. August 19, patient appeared toxic, very weak and practically in coma. The physical examination, that day, revealed an extremely emaciated woman. The pupils were equal, dilated, and reacted normally to light. The nose and ears were negative. The tongue was coated, the lower gum showed evidence of inflammation. The chest disclosed an enlarged heart with a distinct systolic aortic murmur. The right lung presented a small area of dullness of the middle lobe, the left was negative. The abdomen slightly distended, was tender but not rigid. The recent suprapubic incision over the middle line was healed. A palpable mass was felt over the right kidney region. As the patient was acutely ill, it was impossible to ascertain whether this mass was a large misplaced kidney or tumor. The lower extremities were edematous, especially the ankles. The blood pressure was 100 systolic and 70 diastolic.

A catheterized urine specimen, obtained the same day, impressed me by its appearance. It resembled a specimen of milk, was fatty in consistency with a heavy sediment. It contained albumin 3%, acetone ++, diacetic acid ++, indican +++, fat ++++. Microscopic examination of the sediment showed a large number of mycelia resembling those of *actinomyces bovis*. Only a few

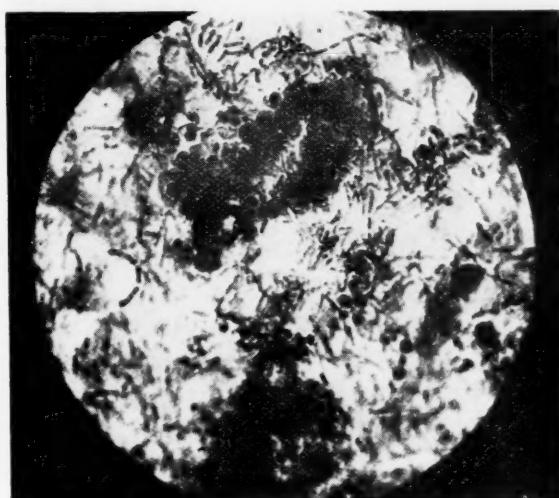


Fig. 1—Urine sediment. High power. Showing a colony in a crushed granule of *actinomyces bovis*.

* From the Department of Pathology of the Traverse City State and General Hospitals.

** Presented before the Grand Traverse Leelanau County Medical Society.

† Dr. Pauline Beregoff, Ph. G., 1918; M. D., 1925; La Facultad de Medicina de la Universidad de Cartagena, Colombia, S. A. Ex-professor in bacteriology and parasitology of the University of Cartagena, Colombia, S. A. Pathologist at the state and general hospitals of Traverse City, Mich.

clubs of the fungi were noticed. There were many granular casts, renal cells and an abundance of pus cells. This sediment was cultured

and a pure culture of *actinomyces bovis* was obtained. The blood count revealed 3,500,000 erythrocytes and 28,000 white cells. The polymorphonuclear count was 86% showing 10% eosinophiles.

The patient continued to grow worse and died August 21. A partial necropsy comprising the abdominal cavity was permitted.

NECROPSY

The intestinal mass appeared normal. The gall bladder was distended and contained two small stones. It showed no evidence of acute inflammatory changes. The liver was firm, pale and of normal

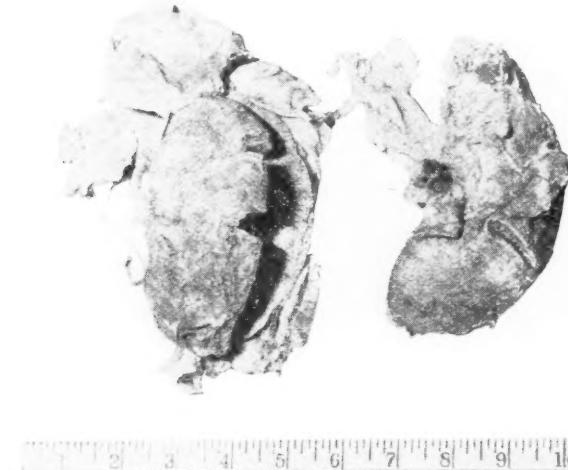


Fig. 2—Kidneys: The right has its capsule stripped off, showing a granulated surface; the left presents areas of necrosis of the capsule.

size. The right kidney was embedded in an excessive mass of perinephritic fat and somewhat displaced toward the diaphragm. It measured with the capsule attached, 7½ by 4 by 2 inches and weighed 535 grams. The capsule was covered with exudate, was thick and adherent. While stripping it bits of parenchyma came away with the cap-



Fig. 3—Sectioned kidneys, (they were fixed in formalin).

sule and many small abscesses were opened discharging a thick creamy pus. The cortex presented an irregularly lobulated surface. When one of these lobulations was incised yellowish pus of thick consistency exuded. The cut surface of the kidney showed many scattered abscesses,

notably at the bases of the pyramids. There was much fatty degeneration and considerable destruction of renal structure. The pelvis was dilated and filled with thick creamy fluid resembling that of the urine sediment. The left kidney was normally situated. It was insheathed in a dense fibro-fatty layer composed of perirenal tissue transformed by the inflammatory process. It weighed 420 grams and measured 5 by 2½ by 2 inches. It showed similar changes of the renal structure to the right kidney, but not so extensive. The ureters of both kidneys were three times the normal size. The bladder was filled with milky muco-purulent urine and showed no pathology of the organ. The suprarenals were enlarged and except for fatty degeneration showed nothing of importance.

An attempt was made to palpate the heart and lungs by entering through the diaphragm. The heart was large and firm. It was difficult to palpate the lungs, yet it was possible to feel a nodule, the size of a walnut, in the adhered middle lobe of the right lung. The nodule was soft but deeply embedded. An attempt to remove it caused hemorrhage and the physician on the case did not permit further investigation. However, enough material of the nodule had been removed for examination that showed the presence of the fungi.

Sections taken from the kidneys presented collecting tubules and pyramids filled with polymorphonuclear leucocytes, which were also numerously distributed between the lining epithelial cells and interlobular tissue. Plasma cells extended throughout the areas. Abscess formation was seen all over the renal tissue. Also over many areas of necrosis there were

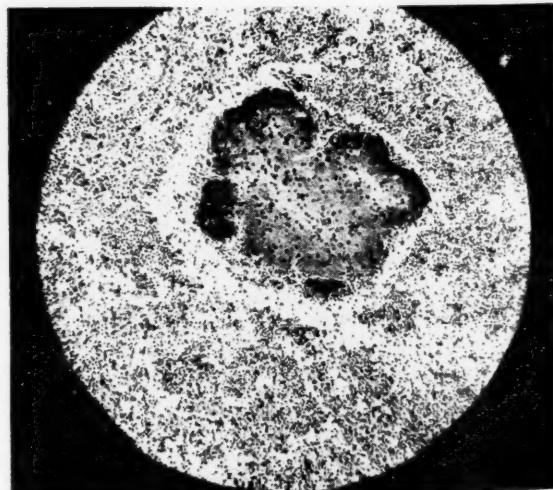


Fig. 4—Photomicrograph of a section of the kidneys, showing the fungi surrounded by pus cells. Low power.

colonies of the fungi of actinomyces bovis, surrounded by polymorphonuclear and endothelial cells. The smears taken from the pelvis and from the opened abscesses of both kidneys showed the mycelia of the fungi in large numbers.

COMMENT

This case is of interest for a few reasons. First it shows the importance of having a trained worker examine urine sediments. The routine urines are usually examined by technicians who know very little about parasitology, therefore many important findings remain unrecognized. The physicians who treated our case, had no suspicion whatever of the infection. If the diagnosis of renal actinomycosis would

have been made previous to the operation other treatment would have been given. Furthermore, it is rare to find the kidneys alone, of all the abdominal organs, to be infected. In our case, the primary focus of infection was probably in the gums, extending then to the lung and kidneys. Besides, the rarity of finding the fungi in the urine is of much interest.

END

I wish to thank Doctors Swanton and Flood for permitting me to study up this case.

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REACTION OF THYROID GLAND TO INFECTIONS IN OTHER PARTS OF BODY

Further work done by Warren H. Cole and Nathan A. Womack, St. Louis, on the relation of infections and toxemias to the histologic picture of the thyroid gland confirms their observations concerning the production of hyperplasia, loss of colloid, desquamation and decrease in iodine content in certain septic processes and toxemias. Somewhat similar observations have been recorded by other workers. The authors have developed a toxin containing a group of four organisms which, when injected subcutaneously into dogs, will produce these changes in practically 100 per cent of the animals if iodine has not been ingested by them. The average iodine content of the thyroid or normal dogs is 0.304 mg. per kilogram of body weight, whereas the average iodine content of the thyroid glands of animals dying from severe infections is 0.142 mg. per kilogram of body weight. Similar changes have been observed in the thyroid glands of human beings who have succumbed to acute infections, but these changes are present to a lesser degree. Evidence points to a relation of infections to hyperplastic glands in human beings. Basal metabolic studies

made by the authors on animals with hyperplastic glands produced by toxemias and infections have revealed a basal metabolic rate elevated out of proportion to the fever. Injection of toxic doses of histamine produces a marked rise in the metabolic rate, without a significant rise in temperature, and also creates a desquamation, loss of colloid, decrease in iodine content and beginning hyperplasia in the thyroid gland. Injection of toxic doses of an aminoacid (glycocoll) produces the same histologic changes. The pathologic changes already mentioned in the thyroid as produced by infections can be prevented to a great extent by the oral administration of iodine. The data assembled support the theory that the thyroid gland takes an active part in the resistance of the body against certain toxins and infections. In spite of the added information that iodine exerts a protective role in the attack on the thyroid by infections, the authors still feel reluctant to advise the therapeutic administration of iodine to human beings suffering from severe infections.—Journal A. M. A.

NORMAL HEART OFTEN

If you are kept awake at night by your heart acting strangely, especially upon first lying down, you need not be alarmed. Irregular or extra heart beats are perfectly normal in a great many cases. In fact, extra beats are a carefully planned act of Nature, meant to insure continued beating of the heart, in the opinion of Dr. Milton J. Raisbeck of New York City. The heart is made up of a great many cells. Each cell is capable of starting the contraction which we know as the heart

BEATS IRREGULARLY

beat. Some of the cells commonly set the pace or rate at which the heart beats. Sometimes these change their pace, particularly when a person rests after exercise. If the pacemakers change very quickly, a few of the other cells may not be able to keep the pace. Then you are conscious of an extra or irregular beat, Dr. Raisbeck explained. Fear should not be felt at such irregularity, and Dr. Raisbeck urged physicians not to frighten their patients by telling them they have irregular hearts.—Science Service.

ACUTE MILIARY TORULOSIS OF LUNGS

Edwin F. Hirsch and George H. Coleman, Chicago, report on a case of acute miliary torulosis of the lungs. In cultures of the spinal fluid and in blood from the right ventricle of the heart removed during the postmortem examination, *Torula histolytica* was isolated. They state that acute miliary torulosis of the lungs follows a blood stream dissemination of the torula organisms from some chronic lesion. Although other reports mention chronic changes of the lungs,

their case seems to be the only one in which all of the lung changes were acute. The chronic lesions from which the torula organisms were liberated probably are those in the meninges or tissues of the middle cranial fossa. The location of these about the gasserian ganglions and the middle meningeal arteries suggests that the infection of the meninges has extended along these structures from the nasopharynx.

MICHIGAN'S DEPARTMENT OF HEALTH

GUY L. KIEFER, M. D., Commissioner
LANSING, MICHIGAN

UNIFORMITY OF SEROLOGICAL TESTS FOR SYPHILIS
IN THE STATE OF MICHIGAN

The degree of uniformity of the serological tests for syphilis carried out throughout the state has recently been subjected to a 10 months' study in which nine laboratories co-operated with the Bureau of Laboratories of the Michigan Department of Health at Lansing. At intervals of about a month a set of sera was submitted from Lansing to each of the co-operating laboratories, similar sets being submitted in return to Lansing from these laboratories.

The results obtained at two of the three laboratories using one or more modification of the complement fixation method show satisfactory agreement with Lansing. A very close agreement with Lansing is shown for five of the laboratories using the technic that is standard in the laboratories of the Michigan Department of Health. Indeed, of a total of 362 specimens tested in duplicate by the Lansing laboratory and this group of five laboratories, there was not a single case of absolute disagreement, and only one relative disagreement was found in which the variation was between + + + + and +.

These results speak favorably for the degree of standardization of which the Kahn test is capable. Furthermore, they show the value of comparative studies of this sort by suggesting that when comparative blood tests from two laboratories using the

Kahn test disagree completely in more than 1 or 2 per cent of the cases tested, the test is not being carried out in strict accordance with standard directions in one or both of these laboratories, or the antigen used is not of standard sensitiveness. As a result of this study two of the collaborating laboratories are making the necessary modification in technical detail and in antigen.

The specimens sent from Lansing had not been inactivated. They were prepared from the unheated portions of the daily specimens, pooled so as to give strongly positive and negative results and a few weak reactions. A sample portion withdrawn from each of the arbitrarily numbered specimens was inactivated for 30 minutes at 56°C, and tested in the regular 3-tube Kahn procedure and in the 1-tube presumptive procedure, the latter as a check on the negative reactions. The results were retained at Lansing.

The specimens sent to Lansing from the other laboratories included both pooled and individual sera; a note accompanying each set of specimens indicated the heat treatment to which they had been subjected. Before being tested at Lansing the raw sera received were inactivated at 56°C for 30 minutes; sera that had been inactivated for 30 minutes were reheated at 56°C for 15 minutes, and a few specimens that had been heated for 15 minutes at 50°C were reheated at the same temperature for 20 minutes.

Of the nine collaborating laboratories, six, including the two branch laboratories of the Michigan Department of Health, use the Kahn test exclusively. In these cases the average of the 3-tube Kahn test was used as a basis of comparison. In three of the collaborating laboratories, one or more modification of the Wassermann technic was used, with or without the Kahn test. When the Wassermann results were reported on the

Laboratory & Tests	RESULTS			COMPARISON WITH LANSING RESULTS						PERCENT			
	Total Number Sera Tested	Lansing Laboratory	Other Laboratory	Absolute Agreement			Agreement #N vs #N	Partial Agreement #N vs +	Relative Disagreement #N vs -	Absolute Disagreement #N vs ±	Agreement & Absolute Agreement #N vs -	Partial Agreement & Absolute Agreement #N vs -	
				#+	#-	#±							
Laboratory No. 1 Kahn Test	82	37 7 36	38 5 39	36	3	-	36	5				100	100
Laboratory No. 2 Kahn Test	66	28 5 33	31 2 33	28			33	5				100	100
Laboratory No. 3 Kahn Test	66	26 10 30	28 5 33	26	4	-	30	5	1			98.5	100
Laboratory No. 4 Kahn Test	77	31 10 36	34 7 36	31	4	-	36	5	1			98.7	100
Laboratory No. 5 Kahn Test	71	31 4 36	34 5 34	31			34	2	3	1		94.3	98.6
Laboratory No. 6 Kahn Test	73	34 6 35	33 10 30	29			27	7	2	4	4	86.3	89.0
Laboratory No. 7 Kahn Test Kolmer Test	95	40 12 43	46 8 41	40	2	2	41	4	1	2	3	93.7	94.7
Laboratory No. 8 Kahn Test Kolmer Test	94	41 6 47	43 4 47	40	2	1	42	5	3	4	3	89.5	92.6
Laboratory No. 9 Wassermann:													
Alcoholic Abt. Coltest.	71	31 4 36	35 1 37	30			36	3	1		1	97.2	98.6
Coltest.	71	31 4 36	34 1 37	30			36	3	2		1	97.2	100
Kolmer	71	31 4 36	33 1 37	30			35	3	1		1	97.2	98.6
Summary	1026	442 90 494	466 65 495	424	16	3	480	53	22	11	17	95.1	97.4

++++ scale, the report was compared directly with the average of the 3-tube Kahn test. The following scheme was used to convert the quantitative results of the Kolmer test to the ++++ system:

4441 to 42100 (including 24440)	++++
44000 to 42000, 333000, 321000, 32000	+++
41000, 32000, to 30000, 22200, 22000, 21100	++
21000, 20000, 11100	+
11000, 10000	-
00000	-

In the accompanying table the reactions obtained with each technic employed in the different laboratories are compared with the Lansing reactions. The results are grouped under five main headings. "Absolute Agreement" refers to cases in which identical reactions were obtained. Under this heading ++++ and negative reactions are listed separately from weakly positive and doubtful reactions. Under "Agreement" are given the reactions differing by + or +-, excepting the case of (+ vs. -) which is listed in the next column headed "Partial Agreement". This third column includes in addition positive reactions varying by ++. As "Relative Disagreements" are listed ++++ versus +, — versus +-, and ++ versus —, while ++++ versus + and +++ or ++++ versus —, are classed as "Absolute Disagreement". The discrepancies are not analyzed into those in which the Lansing laboratory showed the more sensitive or the less sensitive reaction, since the total number of discrepancies is too limited to permit safe conclusions regarding the comparative degree of sensitivity of the technic employed in the different laboratories. In the last two columns are given the percentage of agreement to within +, on the one hand, and the percentage of agreement to within ++ on the other hand.

C. C. Young, D. P. H.,
Director of Laboratories,
Grace Lubkin, Ph. D., Serologist,
Bureau of Laboratories,
Michigan Department of Health.

A. M. A. CONFERENCE ON PUBLIC HEALTH

At the third Conference on Public Health sponsored by the American Medical Association and held in Chicago on March 29 and 30, Dr. Guy L. Kiefer spoke from the standpoint of the official health agency in discussing "How the Various Agencies Interested in Public Health May Best Work Together for Its Promotion."

Dr. Kiefer stressed especially the usual role of the voluntary health agency, that of promotion, the function of the official health agency, that of demonstration, and the duty of the private physician, that of

incorporating in his practice many phases of public health activities.

MARCH CONTAGIOUS DISEASE SITUATION

With the advent of more days of sunshine, and people getting into the fresh air more, contagious disease begins to decrease. This usual seasonal decrease has been taking place, except in the case of scarlet fever and meningitis.

Scarlet fever in a very mild form has been slightly more prevalent than usual since early in January. The average number of cases reported during the month of March for the past five years has been 1,629. In March, 1929, a total of 2,034 cases were reported. This is an increase of 400 cases over the five-year average. It would therefore be safe to say that scarlet fever is about 25 per cent more prevalent in the state than the average for this time of year.

Field studies of many of these cases reveal that they are very mild. The death rate has been very low. The mildness of these cases has, however, been a considerable factor in their spread. In many of the places where outbreaks have occurred, epidemiological study shows that the infection was brought into the city or village by a mild case masquerading as a sore throat. The ensuing cases were very mild, many of them not calling a physician and hence no true diagnosis was obtained until the investigation by the State Department of Health.

Scarlet fever streptococcus antitoxin has been used with marked success, especially in the serious toxic cases.

Cases of meningitis have been reported with increasing frequency since the first of the year. The increase has been noted in all parts of the state, almost in direct proportion to the density of population. The more populous centers have had more cases than the sparsely populated sections. From January 1 to March 25, 99 cases have been reported in Saginaw. Thirty-five cases had fatal termination, death occurring, with few exceptions, within two or three days. Laboratory studies showed that the responsible organism was meningococcus, type 2.

Detroit reported cases during the month of March at the rate of two to three each day. The death rate in the Detroit cases is about 70 per cent. The colored population is attacked with about twice the frequency of the white population.

In several other parts of the state, cases

of meningitis have been occurring, but these cases are very much scattered, with no history of contact from one to another. The five-year average for the month of March is 14 reported cases. During 1929, there were 98 cases reported in February, and 209 cases reported in March.—D. M. G.

PRESENT STATUS OF THE LAKE LEVELS CONTROVERSY

The suit brought by the States of Wisconsin, Minnesota, Ohio, Pennsylvania, Michigan, and New York, in the Supreme Court of the United States, against the State of Illinois and the Sanitary District of Chicago was referred to Honorable Charles Evans Hughes, Special Master. Hearings were conducted before him in the city of Washington during the latter part of 1927.

Judge Hughes submitted his report to the Court on November 3, 1927. The opinion of the Court was made public on January 14, 1929. Master Chief Justice Taft delivered the opinion of the Court. This opinion referred to Special Master Hughes three points on which the Court wished further testimony to be taken and a subsequent report rendered. These points are: 1. What has the Chicago District of Sanitation done to enable the diversion from Lake Michigan to be reduced. 2. How long will it take the Sanitary District to complete the work now in contemplation so that lake diversion may be further reduced. 3. What amount of water, if any, is necessary to be diverted from Lake Michigan for the purposes of navigation in the Chicago River as part of the port of Chicago. The opinion clearly sets forth that the only legal reason for diversion is to keep up navigation. It does not recognize the validity of diversion for purposes of sanitation.

From March 25 until March 29 additional hearings were conducted in Chicago in the Federal Building before Judge Hughes on these points. The complainant states submitted no testimony in these hearings. The testimony submitted by the Sanitary District was to the effect that about 15 years would be required to complete the work and that at least 2,000 cubic feet per second would be necessary in addition to the water pumped from the lake for water supply purposes in order to prevent conditions in the Chicago River which would be objectionable to navigation. Testimony was also introduced to show how far the work on contemplated treatment plants had progressed.

The State of Michigan was represented by Attorney Wilbur M. Brucker who was assisted by Edward D. Rich, Director of the Bureau of Engineering, and William F. Shepherd, Assistant Engineer.

The hearing will be resumed at the United States Chamber of Commerce Building, Washington, D. C., on April 15, at 11 o'clock, at which time it is expected that rebuttal testimony will be introduced to show that the proposed works at Chicago can be completed in much less than 15 years. It is probable that most of the testimony to be submitted will be furnished at the forthcoming hearing, for there are certain details with reference to control works in the Chicago River on which the Chief of Engineers of the U. S. Army is to give an opinion later.

Inasmuch as Judge Hughes leaves May 1 for Europe to attend the sessions of the World Court, further hearings will probably be postponed until after his return, which will be October 1.—E. D. R.

UPPER PENINSULA NURSES' CONFERENCE

A conference of Public Health Nurses of the Upper Peninsula was held in Marquette March 15 and 16. This was well attended by both nurses and lay people interested in the work. Over 40 nurses were present.

The Superintendent of Schools in Neogaunee supplied substitutes for any teachers wishing to attend the conference on Friday afternoon to hear the discussion on immunization. Many teachers took advantage of this offer.

The active part which the nurses took in all discussions showed how keenly they were interested. The recent thaw had made travel by automobile impractical but no one appeared to mind the inconvenience of a night trip even when it included a change of train enroute. It was necessary for the nurses from Ontonagon to leave home Thursday afternoon, travel all night and arrive in Marquette at 5:00 a. m. Enthusiasm of this type always makes a meeting interesting.

PROGRAM

Friday, March 15—

Organization for an Immunization Campaign.

Dr. Frank Poole.

Prenatal and Infant Nursing.

Ellen Atchison, R. N.

A School Nursing Program.

Norma Eskil, R. N.

Saturday, March 16—

Educating by Exhibits. Pearl Turner.

Nutrition as a Part of a Nursing Program.

Margaret Harris.

Social Service and the Nurse.

Mrs. Salvatore Lojacono.

VISITS OF ENGINEERS DURING MONTH OF
MARCH, 1929

Inspections of railroad water supplies: total 17.

Bay City	Petoskey
Boyne City	Plymouth
Cadillac	Pontiac
East Tawas	Port Hope
Gaylord	Richmond
Gladwin (2)	Rochester
Mt. Pleasant (2)	Saginaw (2)
Oxford	

Inspections and conferences, water supplies: total 91.

Algonac	Leslie
Allegan (2)	Litchfield
Anchor Bay Beach	Manchester
Athens	Marcellus
Boroda	Marine City (6)
Belleville	Mendon
Benton Harbor (4)	Middleville (3)
Berrien Springs	Milan
Big Rapids (3)	Morenci (2)
Brooklyn	Muskegon (2)
Buchanan	Nashville (2)
Cadillac (2)	New Baltimore (2)
Cassopolis (2)	Niles
Chelsea	Onsted
Clinton	Otsego (2)
Coloma	Owosso (2)
Coopersville	Port Huron (2)
Decatur	Reading
Dexter	Saline
Douglas	Saugatuck
Dowagiac (2)	Schoolcraft
Dundee	Sparta (2)
Fennville	Spring Lake
Gobles	St. Clair (3)
Hartford	St. Joseph (2)
Homer	Union City
Ira Township	Vicksburg (4)
Lawrence	Watervliet (2)
Lawton	Wayland (2)

Inspections and conferences, sewerage and sewage disposal: total 13.

Detroit	Niles
Dowagiac	Owosso (3)
Grand Rapids	Port Huron
Island Lake	St. Joseph
Lansing	Van Etten Lake
Litchfield	

Inspections and conferences, swimming pools: total 13.

Albion	Dearborn
Cadillac (2)	Grand Rapids (6)
Coldwater	Lansing (2)

Inspections and conferences, stream pollution: total 1.

Owosso

Inspections and conferences, miscellaneous: total 11.

Detroit—Lake Levels Suit at Chicago.
Detroit—Water Supply for Danish Club near Detroit.
Elk Lake—Resort Sanitation.
Grand Rapids—Septic tank for school.
Ingham County—T. B. Sanatorium-Drainage.
Lansing—Resort Sanitation.
Lansing—Drainage Nuisance Lansing Township.
Lansing Township—Septic tank.

Marcellus—Sewage treatment for school.
Port Huron—Resort Sanitation.
Wayland—Nuisance.

PREVALENCE OF DISEASE

	March Report			
	February	Cases Reported	March	Average
Pneumonia	1,074	846	1,039	5 yrs. 964
Tuberculosis	403	414	436	390
Typhoid Fever	11	22	19	36
Diphtheria	320	411	282	419
Whooping Cough	904	1,049	663	632
Scarlet Fever	1,451	2,034	1,143	1,629
Measles	1,408	2,336	5,839	3,887
Smallpox	144	364	154	243
Menigitis	98	209	16	14
Poliomyelitis	3	4	2	3
Syphilis	971	1,146	1,448	1,328
Gonorrhea	385	442	735	781
Chancroid	1	9	6	11

CONDENSED MONTHLY REPORT

Michigan Department of Health Laboratories

	+	-	++	Total
Lansing Laboratory—				
Throat Swabs for Diphtheria				1298
Diagnosis	34	454		
Release	69	240		
Carrier	26	453		
Virulence Tests	12	10		
Throat Swabs for Hemolytic Streptococci				774
Diagnosis	181	114		
Carrier	89	390		
Throat Swabs for Vincent's	70	418		488
Syphilis				9353
Kahn	1461	7798	91	
Wassermann		1		
Darkfield		2		
Examination for Gonococci	127	1205		1332
B. Tuberculosis				650
Sputum	87	513		
Animal Inoculations	3	47		
Typhoid				127
Feces	6	44		
Blood Cultures	1	30		
Widals	7	38		
Urine		1		
B. Abortus	1	40		41
Dysentery	1	32		33
Intestinal Parasites				13
Transudates and Exudates				321
Blood Examinations (not classified)				210
Urine Examinations (not classified)				386
Water and Sewage Examinations				503
Milk Examinations				116
Toxicological Examinations				1
Autogenous Vaccines				209
Supplementary Examinations				1399
Unclassified Examinations				17254
Total for the Month				134212
Cumulative Total (fiscal yr.)				
Increase over this month last year				1680
Houghton Laboratory—				
Examinations made — total for the Month				1888
Cumulative Total (fiscal yr.)				13478
Decrease over this month last year				404
Grand Rapids Laboratory—				
Examinations made — total for the Month				7586
Cumulative Total (fiscal yr.)				59521
Decrease over this month last year				195
Typhoid Vaccine Distributed, e. c.				1340
Diphtheria Antitoxin Distributed, units				37103000
Diphtheria Toxin Antitoxin Distributed, e. c.				20480
Silver Nitrate Ampules Distributed				7792
Scarlet Fever Antitoxin Distributed, pkg.				171
Scarlet Fever Toxin Dick Test Distributed, e. c.				1410
Scarlet Fever Toxin Immunization Distributed, e. c.				3832
Smallpox Vaccine Distributed, pts.				31360
Bacteriophage Distributed, e. c.				4949

THE EVOLUTION OF RADIOLOGY

J. H. DEMPSTER

(Editor Journal M. S. M. S.)

The story of the X-rays naturally includes an account of the development of our knowledge of light and electricity, and as we shall see of the vacuum as well. Electricity as a science is very modern though the phenomenon was first observed by Thales of Miletus (639-544 B. C.) who noted a peculiar attraction for light substances, of amber after being subjected to rubbing or friction. Interesting to note is the fact that electricity was used as a therapeutic agent as far back as (50 A. D.) when a freedman of the Emperor Tiberius was reported cured of gout from the shocks from a torpedo fish. Galen (131-201 A. D.) alludes to the therapeutic properties of electricity. Then for a period, coincident with the so-called dark ages, we hear nothing of electricity, magnetism nor light until the year 1600 when William Gilbert, (1544-1603) an English physician, published his "De Magnete." The very earliest accounts of electrical phenomena are associated with medicine. Gilbert's work was an attempt to clarify the confused ideas of the alchemists. He was physician to Queen Elizabeth and President of the Royal College of Physicians. Gilbert who gave us the word "electric" in reality laid the foundation of the science of electricity. His service to electrical science had its resemblance to that of Paracelsus in medicine. Both broke with tradition and began investigating anew. Gilbert's place in history is better understood when it is realized that he was a contemporary of Francis Bacon and that he died when Harvey was only twenty-five years old. In addition to his summation of knowledge of electricity up to his time, he discovered the magnetic lines of force and the north and south poles of the magnet. According to Millikan* there are no electrical theories of any kind that go beyond Benjamin Franklin's time (1750) apart from the discovery by the Greeks, namely, that rubbed amber had the power of attracting to itself light objects.

Stephen Grey of London in 1730 found out that electricity was conducted along metal wires. The early development of static electricity is associated with the name of Benjamin Franklin whose long life (1706-1790) was concerned with so many scientific and cultural activities. His kite experiment which demonstrated the electrical nature of lightning (1749) is well known. He maintained that electrical matter consisted of particles extremely subtle and he recognized the properties of metallic points "in drawing off and throwing on the electric fluid." His one-fluid theory of electricity was the vogue among physicists for a century and a half. The Leyden jar was discovered in 1745 and was immediately turned to therapeutic uses, the extravagant claims of which were investigated and largely dispelled by Franklin.

IMPORTANCE OF THE VACUUM

Curious as it may seem, hand in hand with the development of knowledge of electricity, we have the discovery of the entirely empty space or vacuum which was necessary for the subsequent invention and development of the X-ray tube. With the discovery of the vacuum is associated the name of Torricelli, a friend and pupil of Galileo, who first conceived the idea of vacuum

in 1643 by noting the empty space produced by a barometric column of mercury. Following this discovery in the next two centuries, we have many kinds of air pumps. Two are mentioned which have been found most serviceable in exhausting the tubes of early physicists, namely, the Topler pump (1862) and the Sprengel (1865). The importance of high vacuum pumps can scarcely be appreciated. Pumps in use at the present time can accomplish in a few seconds what would have required two hours a quarter of a century ago. It is possible now to reduce the pressure in scientific apparatus by means of modern air pumps so that only one in every 100,000,000,000 of the molecules originally present remains.* "This improvement in the technic of producing high vacua," writes W. F. G. Swann,** "rendered necessary for investigation in pure science, has made possible the electric lamps which we use today. It has rendered possible also the modern X-ray tube, an instrument not only infinitely more reliable than the weak and capricious tubes of twenty years ago, but controllable in intensity to amounts twenty times as great as those formerly attainable." Incidentally, it may be stated that it is through the perfection of high vacuum tech-nic that the modern radio broadcasting station has been made possible.

THE HISTORY OF THE DISCHARGE TUBE

The immediate history of the X-rays is in reality the story of the so-called "discharge" tube. One of the earliest tubes, if not the first, was constructed by Watson in 1751. Morgan, an Englishman, was the next of note to experiment with the vacuum tube. Kaye says of Morgan's work: "It seems not unlikely that the first experimenter to generate X-rays—had he but known it—was Morgan, who in London in 1785, by boiling and so outgassing the mercury in a barometric 'gage' was able to obtain a good Torricellian vacuum, that an electric discharge was prevented from passing. This was a big advance in vacuum technic. Morgan used a piece of tin-foil wrapped outside the tube as one terminal. The tube presently cracked and we read that he obtained a beautiful green electric light followed by blue and purple colors."

In 1821 Davy experimented with discharge tubes and in 1838 Faraday made important discoveries of the dark space near the cathode. The same year Geissler in Germany devised discharge tubes with sealed-in terminals of platinum wire. In 1865 Hittorf is said to have discovered the peculiar radiation since known as cathode rays. Leonard, a French physicist, also experimented with the discharge tube so that England, France and Germany all came in for whatever there was of credit.

In the early eighties William Crooks carried the work of investigating the discharge tube perhaps farther than had anyone else. So extensive had been the work of this investigator that the discharge tube has come to be known by his name. The endeavor to ascertain the nature of cathode rays was not satisfied until 1897, when Professor J. J. Thompson discovered the electron. It was during his search for invisible

* The Electron. University of Chicago Press.

** Swann, Scientific American Sept. 1928.

** Loc. cit.

rays from the discharge tube that Roentgen discovered the peculiar form of radiation since so well known by his name.

A TRULY EPOCH-MAKING DISCOVERY

It would seem that the discovery of the X-rays was made from observing the effects upon a fluorescent screen of the phenomenon within the tube. In one of the most epoch-making papers* read before a scientific society under the title "Concerning a New Kind of Ray," Roentgen presented before the Physical Institute of the University of Wurzburg his ratiocination on the phenomena observed:

"If a Hittorf tube, a Leonard tube pumped sufficiently high, a Crookes tube or similar apparatus is covered with a rather closely-fitting shell of thin, black paste-board, if then the current from a rather large induction coil is sent through this tube, and if a paper screen, covered with barium platinocyanide, is brought near the tube in a completely darkened room, the screen will be seen to light up brilliantly and to fluoresce, regardless whether the coated side or the other side is turned toward the apparatus.

"It is easily proved that the cause of the fluorescence has its source in the tube and in no other place.

"Most surprising in this phenomenon is the fact that some agent penetrates a black paste-board shell, which does not allow passage of visible or ultra-violet rays of the sun or of the electric arc, and that this agent can cause brilliant fluorescence. The next question is whether other bodies possess the same property, i. e., are transparent to this agent.

"It soon became evident that all the other bodies are transparent, but in greatly varying degrees. For example, paper is very transparent. Behind a bound book of about 1,000 pages, I saw the screen light up distinctly, the black ink of the print apparently offering no resistance. In the same way the screen lit up behind a double pack of cards. The effect of a single card between the apparatus and the screen could hardly be noted by the eye. Also, a piece of tinfoil had little appreciable effect; and only when several layers were placed one on top of another could a shadow be distinctly seen on the screen. Thick blocks of wood are transparent. Two to three centimeters of pine wood absorbed very little. A layer of aluminum, 15 cm. thick, weakened the effect very much, but was not sufficient to efface entirely the fluorescence. Hard rubber discs, even several centimeters thick, were transparent to the rays. Glass plates of the same thickness differed according to whether they contained lead (flint glass) or not, the former being much less transparent than the latter. If one holds his hand between the tube and the screen he sees the darker shadows of the bones in the lighter shadow of the hand itself."

This was back in the fall of 1895.

Roentgen's conclusions still hold good, namely, that the transparency of different substances (to the rays) assuming equal thickness, is regulated by their density. In roentgenography objects,

whether the various organs of the human body or objects in industry, are studied from the viewpoint of density. X-rays are produced whenever and wherever cathode rays come in contact with matter, whether it be the metal target or the glass walls of the X-ray tube. In Roentgen's experiments the "X-rays" resulted from contact of electrons or cathode rays with the glass walls of the tube.

Roentgen's discovery was proclaimed in December 1895. On January 25, 1896, the following appeared in the *Scientific American*:

PROFESSOR ROUTGEN'S WONDERFUL DISCOVERY

"There have been received from Europe by cable very insufficient accounts of a discovery attributed to Professor Routgen, of Wurzburg University. By the use of a radiant state of matter tube, a Crookes tube, it is stated that he has succeeded in obtaining photographic effects through opaque objects. It has long been known that ether waves of long period would pass through matter opaque to short waves, and that such a screen as is afforded by a plate of blackened rock-salt will sift out short waves, while long waves pass through it. In some unexplained way Professor Routgen it is claimed, has succeeded in affecting the sensitive plate with waves which had passed through the opaque body. Metals cutting off all rays alike would produce a shadow, so that a metallic object in a box or embedded in the human system could be made to give some kind of an image. The operations are said to have been conducted without a lens, entirely by shadow.

"This is about the substance of the reports. It is yet too soon to indulge in the wild possibilities that have been suggested for the process. When the details reach us, the process will probably prove to be of scientific rather than of a practical interest."

The *Scientific American* could not be censured for sensationalism. But this was during the precise nineties, before the advent of the yellow journal. On the other hand Roentgen had not become internationally known, for note the spelling of his name by one of the leading Journals of applied science in the Anglo-Saxon world.

AND THE END IS NOT YET

The discovery of the X-rays has revolutionized the physical sciences. In the early nineties physics was considered to have attained its limit, the only thing left for the student was to master the body of knowledge that had accumulated virtually since Newton's day. The discharge tube was brought out on state occasions to be exhibited and then returned to its shelf. The spectacular physical plaything was considered of no possible practical value. However, experience has shown that every advance in knowledge is sooner or later utilized and applied to the service of man. Says Sir Oliver Lodge:

"Perhaps one of the greatest discoveries that has been made in recent times is an enlargement of the category of energy, itself a comparatively modern term in physics, so as to include not only the long known and conservative forms—raised weights, coiled springs, chemical action, heat, light, and sound—together with such newer forms of energy as electric currents, electric charges, and magnetic fields; the list has now to be extended so as to include the very constitution of matter itself."

* A translation of this paper appeared in the April number (1923) of the *American Journal of Roentgenology* and also in the July number of the *Journal of the Roentgen Society*. London.

Contrast conditions immediately before Roentgen's discovery with the marvellous physical laboratories which grace the University campus today. The influence of the discovery is so far reaching that who will attempt today to delimit its bounds?

PHYSICIST AND CLINICIAN COOPERATE

The development of the science and art of radiology has been the work of two somewhat widely diverse callings, namely, those of the clinician and the physicist. The latter with the manufacturers have produced the equipment; the clinician has applied and devised new uses for it.



Exterior of Physics Laboratory, University of Wurzburg—The plaque reads as follows: "In diesem Hause entdeckte W. C. Roentgen im Jahre 1895 die nach ihm benannten Strahlen." (In this building W. C. Roentgen discovered in the 1895 the rays which have been named for him.)

The evolution of the X-ray tube has been described. The development of mechanism for the production of high tension current is a chapter in itself. Mr. E. C. Jerman* has given an interesting account of the development of mechanism for energizing X-ray tubes, from the early static machine and the occasional small induction coil to the perfectly controlled X-ray auto-transformer universally in use at present. Perhaps no other department of physical science has shown greater progress in the same period than the development of X-ray equipment. The early static machine was very unreliable and susceptible to changes in humidity. The second stage in the development of activating mechanism was the induction coil and the milliamperimeter and the inch method of measuring penetration. The third stage was the invention of the X-ray transformer and the fourth was ushered in by the invention of the Coolidge tube and the auto-transformer which afforded much finer control of the various factors than ever before possible. The

* Radiology, Sept. 1925, Vol. V, No. 3.

principle of the hot cathode tube has been extended and modified to include tubes capable of very high voltage, such as two hundred and fifty kilovolts, and comparatively low milliamperage used in deep therapy, and tubes of comparatively low voltage and high milliamperage for fine radiographic work.

The early X-ray tubes were partially exhausted of atmospheric air or contained instead a rarified gas, nitrogen or hydrogen, the degree of hardness depending upon the amount of gas present. These tubes were capable of very fine radiographic work but were difficult to regulate. It required an artist to get the best results with them. The year 1913 is a notable one to the radiologist as marking the invention of the hot cathode tube by Dr. W. D. Coolidge. This tube revolutionized X-ray therapy and contributed towards exactness in radiography. The exhaustion of the air in the tube was carried to a degree never before attained. The function hitherto performed by the rarified gas was now to be performed by heating the filament of the cathode, hence the name "hot cathode" tube. The quantity of X-rays is regulated by the temperature of the cathode filament which is controlled at will by means of a rheostat.

Refinement of technic made possible by mechanical improvements has rendered the X-rays of greater service to medicine and surgery. All this has tended to make the work of the roentgenologist more highly specialized. A great deal more is expected of him than in the days of cruder mechanism.

It remained for the clinician to adapt the X-rays to the diagnosis of pathological conditions affecting the hollow viscera. For this purpose various opaque media have been employed. Advantage was taken of the radiopaque properties of the bismuth salts for radiographic study of the alimentary tract. Among the early workers were Hemmeter and Cannon. The work of the latter on the mechanics of the digestive tract is a pioneer work on the subject. Bismuth, however, had its disadvantages; it was expensive and in some instances toxic in the quantities in which it was used. It was superceded by barium sulphate, the insoluble salt of barium, which is universally used today. The Graham-Cole functional examination of the gallbladder has made necessary another contrast medium in the way of an iodine salt which under certain conditions renders the gallbladder visible. Forestier a number of years ago introduced lipiodol, a radiopaque iodine oil, which is now used in the diagnosis of certain pathological conditions within the thorax, as well as spinal cord, paranasal sinuses, and it has been used also to determine the patency of the fallopian tubes. The leaded catheter and solutions of sodium bromide are employed in the examination of the ureters and the renal pelvis. Air and its constituent gases have filled an important role in the examination of organs which can be brought into relief by the inflation of cavities in which they are situated. The withdrawing of cerebrospinal fluid and inflation of the space with air has facilitated the diagnosis of brain tumors and other abnormal conditions. The injection of sterile air or gas into the peritoneal cavity brings into relief not only the solid abdominal viscera but any adventitious growth or peritoneal adhesions.

THE NATURE OF LIGHT

There have been several theories about the nature of light but none of importance further back

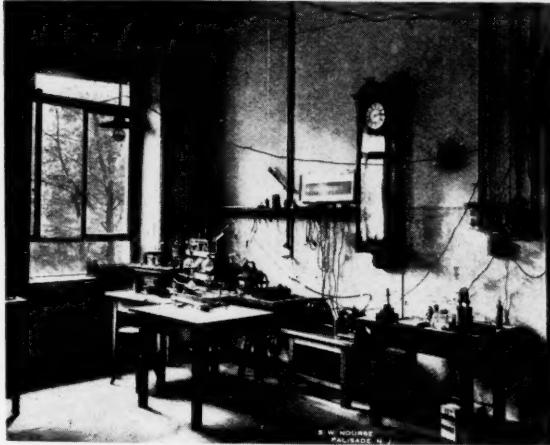
than the seventeenth century. Plato and Aristotle thought that light was a property of the eyes, a view that is soon dispelled by experience with the photographic camera. Isaac Newton (1642-1727) was the real pioneer in the study of light, as well as mechanics. His name is associated in particular with the law of gravitation.

The very law which moulds a tear
And bids it trickle from its source,
That law preserves the earth a sphere
And guides the planets in their course.

Newton proclaimed what was known as the corpuscular theory, assuming that a luminous body shot off small particles which travelled at high speed in straight lines. Newton's law to the effect that the intensity of light varies inversely as the square of the distance from the luminous object has an important application to X-ray calculations, both in radiography and radiotherapy, as well as the safety of the operator. Newton's theory is also known as the "emission" theory in contrast to the wave theory of Newton's Dutch contemporary Huygens. According to Huygens, light was a wave motion passing from luminous bodies into a substance called ether which is presumed to pervade all space. It was not until the nineteenth century, however, that the wave theory came to prevail over the so-called emission or corpuscular theory.

HOW THE X-RAYS DIFFER FROM VISIBLE LIGHT

The X-rays differ from visible light chiefly in wave length, which is measured in Angstrom units.* The wave length of visible light varies



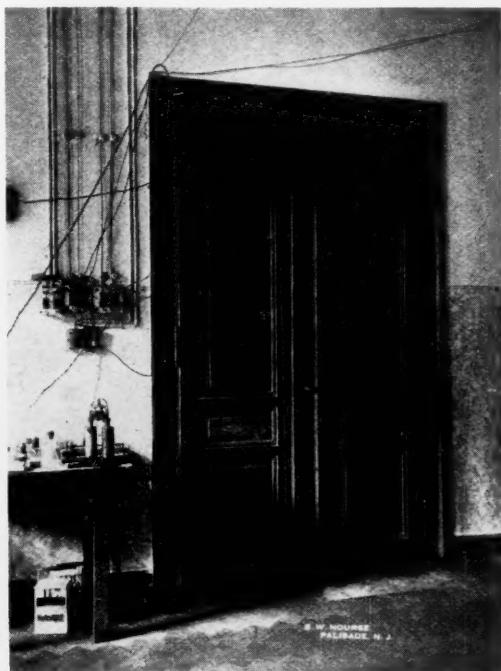
Interior of Laboratory—The laboratory is in active use today, but is said to be practically unchanged. One notes, of course, electric switches, conduits and outlets which were doubtless unheard of in 1895, but laboratory attendants say that the clock, benches, stools, etc., were actually used by Roentgen.

from approximately 3700 A. U. for the violet and 7000 for the red. The X-rays vary from about one-twelfth to one Angstrom unit. According to W. L. Bragg the wave lengths for X-rays are found to lie mainly between 10^{-7} to 10^{-9} cm.

The wave length of X-rays depends upon the voltage which produces them. A very high volt-

* Angstrom, A. J. (1814-1874) Swedish physicist Professor Upsala University. In 1867 he published his map of the solar spectrum which long remained authoritative on questions of wave length. The Angstrom unit is one ten-millionth of millimeter.

age produces X-rays of very short wave length known as hard rays which are of deep penetration. A hard ray does not work satisfactorily in radiographing thin tissues owing to its great penetrability. The best detail radiograph is obtained by using the lowest voltage, therefore, the softest rays that will penetrate the tissues under examination. This enables us to get the delicate nuances and the high lights. It explains why the deep therapy X-ray machine is unsatisfactory for radiographic work and why the comparatively low voltage machine is not suited to deep X-ray therapy. The voltage produced by X-ray machines varies from 30 kilovolts to over 200.



A closer view of the famous door—Roentgen is said to have dismantled this door to determine why plates taken through it showed streaks and bands of decreased density. He demonstrated that the marks were shadows cast by white lead used in cementing the panel mouldings.

The electronic theory of matter is in effect that matter is made up of infinitely small particles separated by spaces infinitely larger than the proton and electron components of the atom.

The most recent theory of the atom serves to explain the penetrability of the X-rays into so-called solid objects, and here I quote from the latest work of Professor Eddington, *The Nature of the Physical World*.**

"The atom is as porous as the solar system. If we eliminated all the unfilled space in a man's body and collected his protons and electrons into one mass, the man would be reduced to a speck just visible with a magnifying glass. This porosity of matter was not foreshadowed in the atomic theory. * * * Thus for the first time the main volume of the atom was entirely evacuated, and a "solar system" type of atom was substituted for a substantial "billiard-ball." * * * Whatever

** *The Nature of the Physical World*, by A. S. Eddington, Professor of Astronomy, University of Cambridge, the MacMillan Company, 1928.

further changes of view are in prospect, a reversion to the old substantial atoms is unthinkable.

"The accepted conclusion at the present day is that all varieties of matter are ultimately composed of two elementary constituents—protons and electrons. Electrically these are the exact opposites of one another, the proton being a charge of positive electricity and the electron a charge of negative electricity. But in other respects their properties are very different. The proton has 1840 times the mass of the electron, so that nearly all the mass of matter is due to its constituent protons. The proton is not found

hydrogen; calcium whose atomic number is 20, is 160,000 times as effective as hydrogen. The human body is made up largely of carbon, oxygen, nitrogen and hydrogen; the bones are largely made up of calcium salts. Hence the explanation of the fact that X-rays which go through the soft tissues of the body are easily stopped by bone. The atomic number of an element is more important than its atomic weight as it represents a fundamental property of the atom, the positive charge on the nucleus. The atomic number indicates the element's place in the periodic series. It has been found that sometimes two or more slightly different elements have the same atomic number. These are known as "isotopes".

We have spoken of the quality of radiation. The quantity of X-rays depends upon the amperage, or rather milliamperage, since we always speak in fractions of an ampere, of current flowing from the anode to the cathode.

THE FLUORESCENT SCREEN

The platino-barium-cyanide screen is older than the discovery of the X-rays, as we have noted in Roentgen's epoch-making paper. Naturally the fluorescent screen was used very early in diagnostic work. The glow or fluorescence of the screen depends upon the quantity of the X-rays in contact with it. To shorten the time of exposure the principle of fluorescence is utilized in the making of radiographs. The briefer the time of exposure of the X-ray film the more satisfactory is the result both for the elimination of movement of the part examined and for the protection of the patient from radiodermatitis which may result from prolonged or repeated exposure. The introduction of duplitized X-ray films* with double contact of fluorescent screens has resulted in an era of improved technic. By the use of so-called intensifying screens the effects of the rays on the sensitive film are multiplied from two to four times.

RADIATION AND BIOLOGY

Reference has been made to the early use of electricity as a therapeutic agent. No one knows when radiation was first thought of as a restorative factor in connection with the health of human beings. The sun bath was already old in the time of Herodotus. The curative uses of sunlight are recorded in the Hippocratic writings. It is a far cry from the first account of light to the work of Sir Isaac Newton, one of the world's greatest masters of scientific research, who found that white light, as it is called, is composed of all the separate colors that comprise what we now call the solar spectrum. At a later time Sir William Herschel, one of the greatest astronomers, lit upon an important discovery, namely, that the different colors of the spectrum varied in temperature, that at the red end being the warmest. This discovery was made in 1800. The following year Ritter, a German chemist, found the chemical action of the extreme violet rays on silver and thereby made



Desk and chair of Professor Roentgen—On the top shelf of the desk are photographs of Roentgen's parents, and lying on the desk are various papers, among them Roentgen's Nobel Prize.

unadulterated except in hydrogen, which seems to be the most primitive form of matter, its atom consisting of one proton and one electron. In other atoms a number of protons and a lesser number of electrons are cemented together to form a nucleus; the electrons required to make up the balance are scattered like remote satellites of the nucleus, and can even escape from the atom and wander freely through the material. The diameter of an electron is about 1/50,000 of the diameter of an atom; that of the nucleus is not very much larger; an isolated proton is supposed to be much smaller still."

According to Bertrand Russell* the capacity of ordinary matter for stopping the X-rays varies as the fourth power of the atomic number of the elements concerned. Carbon, atomic number 6 is 1296 times as effective as hydrogen in stopping X-rays; oxygen, atomic number 8, is 4096 times as effective as H. Nitrogen with an atomic number 7 is 2401 times as effective as hy-

* The A. B. C. of Atoms. E. P. Dutton Company, New York, N. Y.

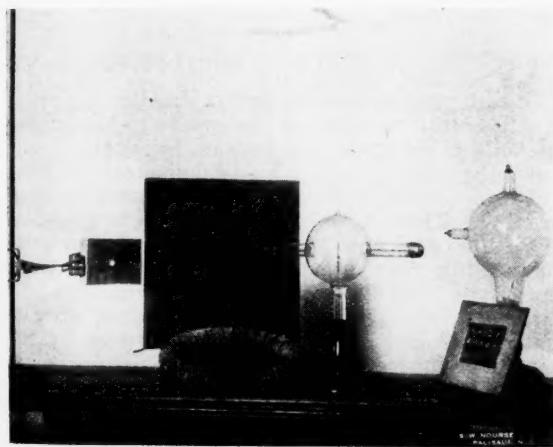
* The development of photography is set forth in the following chronology: Porta described camera obscura in 1558; Niepce made permanent pictures by action of light upon bitumen in 1823; January 1st, 1839 Daguerre in France and Fox Talbot in England announced photographic processes; Sir John Herschel introduced glass plate negatives in 1840; Professor John W. Draper of the University of the City of New York made first photographic portrait in America in 1840; Schonbein and Bottcher, Swiss chemists, made cellulose nitrate, now used for photographic film in 1847; dry plate process was invented in 1855; Dr. R. L. Maddox prepared gelatine emulsion in 1871; Roentgen discovered X-ray photography in 1895.

the first step towards the science and art of photography. The rays upon which Herschel experimented were called infra-red, that is beyond the red; they are known as "heat" rays. Ritter's rays were "ultra" violet. It is doubtful if the so-called infra-red rays have any curative effect upon the human body that is not possessed by any other form of heat such as the common inexpensive hot water bottle. The effective radiation from the sun consists of the invisible ultra-violet rays.

The simplest biologic effect of radiation is seen in tanning of the skin or sunburn by the sun's rays. Before the nature of X-rays and radium were known as now, many of the workers learned of their dangerous effects through bitter experience. Experience has taught that up to a certain degree of radiation the vitality and resisting power of living cells are increased. Beyond this we have destruction of the animal cell. Any bactericidal properties the X-rays appear to have, are not due to the direct effect on the germs so much as the stimulation of the bactericidal power of the body cells. The baneful effect of the X-rays on the growth of staphylococcus is well known. The effect of the X-rays on nerve tissue seems to be proved by the analgesic action and capacity of lessening pain and itching.

So salutary have been the effects of radiation on certain selected skin diseases that X-ray apparatus has come to be a part of routine equipment of the office of a dermatologist.

Embryonic tissue is very susceptible to the X-ray and radium rays. Bergonie and Tribondeau* in 1905 after extensive experimentation



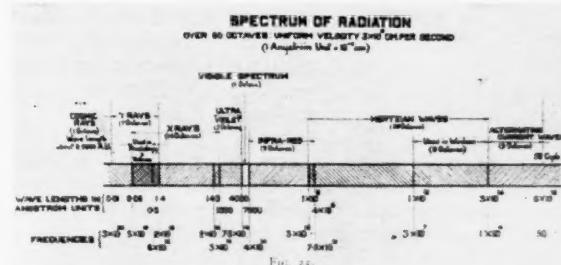
An exhibit of tubes, targets, screens and magnets used by Professor Roentgen in his early work.

made the following generalization which has been known as the Law of Bergonie and Tribondeau. "Immature cells and cells in an active state of division are more sensitive to the X-rays than are cells which have already acquired their fixed adult morphological or physiological characters." Radio-therapy has been to a large degree based on this principle so far as malignancy is concerned; the malignant tumor is considered to bear a resemblance to embryonic tissue.

Biologists have been interested in the effects of X-rays on living cells, particularly the sex cells. The cells of testes and ovaries when treated with the X-rays, if not killed, may be crippled or

* The reader is referred to Radium and X-rays and the Living Cell by Colwell and Russ for a most thorough study of this subject.

changed in such a way as to influence the fate of subsequent generations. This effect is of particular interest. Professor H. G. Muller has studied the effect of X-rays on the inheritance of fruit-flies. A great number of spontaneously occurring, heritable variations have been recorded for these animals during the past twenty years. When wild fruit-flies are exposed to the X-rays the frequency of production of such variations (mutations) is tremendously accelerated. In a single generation more mutants are produced than occur normally in years. This effect of the X-rays is in reality a speeding up of the evolutionary process. Professor P. W. Whitney has demonstrated this same effect of X-rays on the wasp.



—From Kaye's Roentgenology.

The small, unshaded portion shows the proportion of the visible spectrum to the whole range from cosmic rays, the infinitely small through the Hertzian or "radio" waves the infinitely large.

Little and Bagg exposed mice to the X-rays and found that certain of the progeny developed abnormal feet, kidneys and eyes. These mice when bred had abnormal progeny. The defect has persisted in the descendants of X-rayed mice for a hundred generations as a Mendelian recessive. The production of a new inherited character, such as this abnormality in mice, has been interpreted as due to the effect of X-rays on the germ spasm, the mechanism of inheritance.

Not only the X-rays contributed to the science of medicine but they have enabled us to study anatomy and physiology without interfering with the normal vital processes. The morphology and position, as well as normal variations of both, the solid and hollow viscera may be observed without any particular inconvenience to the subject studied. No better method has yet been devised for the study of the mechanics of the digestive tract or the mechanics of respiration. The advantage of X-ray studies of the normal have been impressed upon men like Bernard Shaw who goes so far as to advocate the use of the X-rays as a substitute for vivisection which he condemns. There is no better single method of studying osteology, inasmuch as in a well made radiograph the detail structure of the bone is presented as not possible in any other way. In other words, roentgenography and roentgenoscopy, which means observation by means of the furoscope, constitute a form of biopsy.

X-RAYS IN INDUSTRY

As we have seen, the first use of the X-rays was in diagnosis of lesions of the bony skeleton. Then followed their use in the diagnosis of pathologic conditions affecting the soft tissues. Their more recent application is in the examination and testing of materials in a great many branches of industry. The principle of observation of variations in density is utilized. There is the great

advantage of enabling inspection without injuring the part in any way. It is the only means of detecting concealed defects. Among the uses might be mentioned the detection of defective oxy-acetylene welding, hidden cracks in metal, the examination of wooden parts of aircraft, the detection of foreign bodies in electrical insulators, differentiation of lead glass from more transparent genuine jewels. The X-rays are also valuable in detecting pictures of the old masters from spurious imitations.

Of non-medical uses perhaps the most important field is the employment of X-rays as agents in the various fields of research. Certain branches of physical sciences have really had their beginning with the discovery of the X-rays.

Perhaps as a parting word the writer cannot do better than to mention the various sources of information that he has found of untold value in connection with X-ray studies, among which are: Kaye, Roentgenology 1928, and Kay X-rays; The Atom and the Bohr Theory of Its Structure, Kramers and Holst; New York State Medical Journal; American Journal of Roentgenology; American Journal of Radiology; Journal of Roentgenology (British) for Roentgen's original paper (December 1895); The Electron. Millikan; Radium, X-rays and the Living Cell. Colwell and Russ; and a very recent work The Physical World, by Professor A. S. Eddington.

AS THE PATIENT VIEWS IT

(The Grace Hospital, Detroit, Bulletin)

The hospital's a sunny place,
The linen fresh and white,
A brown-eyed nurse comes through the day;
A blue-eyed one at night.

She'll rub your back and fix the bed
The radio and the light,
Then gives you just a little pat,
And leaves the whole room bright.

The window's opened just enough
To let the night breeze in—
She knocks: the angel comes again,
You have no thought of sin.

Her perfumed hair has touched your cheek;
The world is sweet, 'tis clear—
She whispers; and the sky turns bleak—
"I have your bedpan here."

"Thanks, not tonight," I softly said,
As hope within me stirred,
"The doctor ordered it, you know."
She would not be deterred.

Oh, bedpan, who invented you?
In what deep fires of hell
Did satan, in his vilest mood
Decide strong men to fell.

With this device, so cold and dead?
It humphs one like a camel,
I'd die 'neath lance and ether gas,
Not over white enamel.

Oh, come sweet day, and come on fast
Before my light has blinked,
When nurses nurse, and surgeons surge,
But bedpans are extinct.

—D. F. Strong.

GOOD FOR A COLD

(New York State Medical Journal)

A cold is the oldest of diseases. It is the form of sickness with which everybody is the most familiar, and yet it is the one about which doctors know the least. It is not strange that home remedies are numerous and are most contradictory in their nature. James J. Montague in his department "More Truth Than Poetry" in the Herald Tribune of December 14, discusses some of the sure cures in the following verses:

"You never ought to let a cold
Embrace you with a strangle hold,
Which may bring fevers, aches and chills
And even more appalling ills.
Be warned when you begin to sneeze,
The remedies for colds are these:
Immediately to bed repair,
For colds thrive on chilly air.
Stay out of doors the whole day through,
For that will still the worst 'kerchoo.'
Tuck three big meals in every day
And they will drive the cold away
No cold, however bad, can last,
If for a fortnight you will fast.
If you keep muffled to the neck,
You'll hold the direst cold in check.
No cold can get so very bad
If you go always thinly clad.
Take lots of quinine every night
And soon the cold will be all right.
No medicine that's ever sold
Will cure, or even help, a cold.
No cure in all this list I've shirked
And none of them has ever worked."

THE CRITERION OF A GOOD PHYSICIAN

One of the points in Public Health education should be the training of the public in the proper methods of selecting a physician. Everyone should know that the so-called medical doctors all have had practically the same fundamental medical training. That is, before the doctor can graduate or secure a license from the state to practice the healing art, he must have studied anatomy, physiology, chemistry, embryology, histology and pathology, obstetrics, surgery, medicine, etc., so that if a doctor is known to be licensed by the state one may be certain that his education is sufficient to embrace a knowledge of these fundamental medical sciences.

But aside from the educational qualifications of doctors, which we must leave to the state to supervise, how can the layman be assured that the doctor of his choice is one in whom he can place his entire confidence, especially if he is not personally acquainted with him?

The first step in establishing a doctor as trustworthy may be determined when it is known that he is a member in good standing in his County Medical Society. Mere medical education is not enough to gain entrance to the circles of organized medicine. Membership in the County Medical Society at once establishes the physician in courts of law, in business circles, and in the eyes of his professional brethren as being competent and ethical, and announces to the public that he has a trust to keep in maintaining the ethical standards of his profession.

A proper question from any layman to a doctor is: "Are you a member of your County Medical Society?"—Calhoun County Medical Society Bulletin.

THE JOURNAL OF THE *Michigan State Medical Society*

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MAY, 1929

"I hold every man a debtor to his profession, from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves, by way of amends, to be a help and ornament thereunto."

—Francis Bacon.

EDITORIAL

POST-GRADUATE MEDICAL WORK

A perusal of the bulletin of the Department of Post-Graduate Medicine of the University of Michigan and the Michigan State Medical Society indicates a vast amount of work in the preparation of courses of instruction in medicine, surgery, clinical anatomy and laboratory methods. The work in these subjects will be given in Detroit from May 27th to June 24th inclusive. The sessions will be held in the Receiving, Herman Keifer and the Children's Hospitals where the clinical material is abundant. Courses in Serology and Roentgenology will be given in the University Hospital at Ann Arbor. Many applications for enrollment for both the work in Ann Arbor and Detroit have been received. As the work will be intensive rather than extensive, registration is of necessity lim-

ited, and applications are being accepted in the order in which they are made.

Under the heading Medicine and Surgery we have an interesting variety of topics. To enumerate a few: Case History and Library Research; Constitution; Draper has made an impression of this last subject with many during his visit to Detroit a year ago. Following his visit, an English translation of Pende's work has appeared. A discussion of the subject at this time will be found not only interesting but opportune since it is receiving consideration both here and abroad. The courses will also comprise physical diagnosis with emphasis on methods of periodic physical examinations. The subject of Physical Therapy will be presented. Probably no other branch of Therapy has received such attention within the past few years as ultraviolet radiation, galvanic and faradic currents and diathermy. Too frequently the only instruction available has been by representatives of manufacturing firms. These modes of treatment will come into their own when the physical effects are studied by clinicians. In other words the effects of electrical and radiation therapy upon the body and its organs must be studied and evaluated as have the effects of drugs as therapeutic agents.

Work will be given in cardiology, in metabolic diseases, paediatrics, allergy, tuberculosis, pneumonia, syphilology, endocrinology, infectious diseases, diseases of the alimentary tract, neurology and psychiatry. We have called attention to the importance of neurology and psychiatry to the general physician who is, so to speak, the first line of defense; he sees the neurotic patient first and if there is anything in prevention, the great factor in the work is the general practitioner who must recognize the case before it is pronounced enough for the specialist.

General surgery is provided for in a highly satisfactory way. Here are some of the subjects: shock, the septic hand, general surgical infection, spinal anesthesia, varicose veins, hernia, appendicitis, pre and post-operative care, goitre, osteomyelitis, and gallbladder disease. Work will also be given in orthopedic surgery, urology, proctology, thoracic surgery, gynecology. The course in clinical anatomy will make provision for those who desire to review general or regional anatomy.

The courses in serology at Ann Arbor will include a two weeks' intensive study of the Kahn reaction; advanced courses in

the serology of syphilis as well as courses in general medical laboratory methods.

The X-ray instruction will embrace a study of normal anatomy from the X-ray viewpoint, bone and joint pathology, pulmonary and cardiac diseases, gastro-intestinal diseases, superficial and deep therapy and ultra-violet and diathermy.

In addition to this regular course will be the annual two-day post-graduate clinic in Detroit June 18th and 19th, in conjunction with the Alumni Association of the Detroit College of Medicine and Surgery and the Wayne County Medical Society.

The personnel of the teaching staff has been selected carefully and well. The director and his committees are to be commended for such a splendid beginning in the way of systematic post-graduate instruction.

MEDICAL LEGISLATION

At the time of writing, a bill granting osteopaths the right to practice medicine and surgery has been reported out of committee at Lansing and has passed the senate by the required majority. To become law, however, the bill requires to pass the house of representatives and to receive the governor's signature. Such a circumstance would be a serious set-back to the progress of scientific medicine in this state.

The attitude of the medical profession has been misunderstood in many quarters and their solicitude for the public welfare has been interpreted as the prompting of self-interest. The advances in medicine as every physician knows have resulted from impetus within the profession, self-directed, and not from a demand outside that profession. The motives behind restrictive legislation have been construed as selfish, as working in the interests of the doctors rather than the interests of the people at large.

The sponsor of the osteopathic bill in a sort of casuistic argument sought to show that the training of the osteopath was superior to that of the graduate of such institutions as the medical department of the State University, the Detroit College of Medicine or Harvard or Yale, maintaining that the osteopathic school required more hours of college work than any one of these institutions. If such were the case, there is no valid reason why the well trained osteopath should not be satisfied with medical standards as they already obtain in this state. Why have a separate

board if their requirements are higher than those of the regular profession?

The time was in the memory of many in middle life, when there were several so-called schools of medicine: All have become extinct but the regular profession which endeavors to conform to the findings of pure science where the sciences can contribute to the healing art. There is no sectarianism in physiology, in chemistry, physiological chemistry. Recognition of osteopathy as a system of medicine and surgery is a retrograde movement towards medical sectarianism.

The corrective (should the osteopathic measure become law) will be the work of the board of basic sciences, presuming that when a student has had a full high school training and the prescribed college credits, together with the so-called basic science credit, he will see the folly of training in a sectarian institution of medicine.

MALPRACTICE AGAIN

We have it on good authority that members of the medical profession are threatened for malpractice or actually charged with this peculiar offense, at the rate of about one a day, the year round. It is generally known (we hope thoroughly realized in fact by each member) that the Michigan State Medical Society undertakes the defense of any member in good standing and whose dues are paid up to his County Society through to, and including the supreme court if necessary. This assurance is worth a great deal more than the price of membership in the Society; a fact that only he realizes who has been threatened or who has had to face such a charge.

Attempts are made frequently to make the doctor's lot a hard one. Among the measures introduced into committees during the present legislative session at Lansing is one placing the burden of proof of innocence on the doctor in the event of charge of malpractice or other brought against him. It is the custom in all English speaking countries that the person making an accusation against another must make good, or, in other words, the burden of proof is on the plaintiff rather than the defendant.

Another bill introduced is to the effect that it shall be considered a reprehensible act on the part of a physician (surgeon we presume) to perform any operation other than specified in his understanding with the patient. In other words, if in opening an abdomen to remove a diseased appendix,

the surgeon finds some other condition which might be corrected surgically he must permit his patient to come out of the anesthetic and obtain consent before he can go on with the necessary treatment.

It is a fortunate thing that all legislation is subject to revision by the supreme court whose duty it is to pass upon the constitutionality of it. Of course, in the event of the passage of such legislation defense in malpractice cases is rendered more difficult.

TUBERCULOSIS

This state has not succeeded in controlling the morbidity and mortality from tuberculosis as satisfactorily as we desire. Tuberculosis has long been classed among the preventable diseases and yet we are given to understand that in Wayne, the most populous county of the state and perhaps the county best supplied with physicians and institutions for the care of the tuberculosis patient, the death rate last year was higher than that of 1927. The remedy is eternal vigilance and education as to the nature of the disease and the method of its spread as well as the disciplinary method of affecting a cure.

Michigan, owing to the fact that it is an industrial state, attracts a young population. Tuberculosis is a disease of young adult life. In some of the larger cities of the state, thousands of young men and young women are housed in rooming houses not properly supervised from the viewpoint of sanitation. Often there is both poor ventilation and heating and improper nourishment, all of which is inimical to health. The tendency to urbanization of the young population is to aggravate rather than to improve the situation.

RENAL PHYSIOLOGY

Those who had the good fortune to be present at the Beaumont lectures held under the auspices of the Wayne County Medical Society, Detroit, had a rare treat in the way of first hand personal contact with results of fifteen years of important physiologic research. Dr. Richards, Professor of Pharmacology at the University of Pennsylvania, was the lecturer. Dr. Richards has been engaged in successful investigations into the function of the renal glomeruli. His experimentation and study have been confined to a large extent to a study of the frog. During his years of investigation he and his co-workers have developed a technic that involves a degree

of skill nothing less than wonderful. His contribution consists of a positive and direct demonstration of the glomerular function. He has been able to tap Bowman's capsule and to obtain and analyze the product from the glomerulus produced from the blood supply. Richards affirms Bowman's original filtration theory. The fluid is a filtrate resulting from selective action which under normal conditions keeps back the albumin permitting the filtration of soluble salts and water. Richards has been able to demonstrate the reabsorptive function of the renal tubule. The quantity of fluid produced by each glomerulus has been multiplied by the actually counted number of glomeruli in the frog's kidney. This total amount was found to exceed by far the total finished urine produced as an excretion and separate analyses showed a difference in concentration and that the glomerular filtrate had been deprived of important constituents in the convoluted tubules.

The persistence of the investigator, his unusual mechanical skill and his ingenuity in carrying out analysis of very minute quantities of the kidney's secretion are deserving of the highest commendation.

The Beaumont Foundation Committee is to be congratulated for adding another series of important scientific lectures to the very creditable list of past years.

THE MAKING OF A MEDICAL JOURNAL

We are wondering if the balmy days of the early part of April seduced our readers to the golf links or to the open road and thus prevented the reading of the April number of this Journal. Under County Society Activities the secretary of the Michigan State Medical Society, gave a somewhat detailed account of the various processes connecting with the parturition of copy (contributed articles and all other matter) in the form of this Journal as it reaches the desk of the reader. If you have not already read the comment referred to, please turn to page 338 April Journal. There are also other matters in the same department that should be of paramount interest to every practicing physician.

The complexity of situations, medical, legal and social have kept pace with those of industrial and social existence. In this article the secretary has indicated some of the problems that must be faced in the near future and others which must be met immediately.

A PRECEDENT ESTABLISHED

In a recent number of this Journal were noted two suits for malpractice in which the defendants were assessed damages. In both cases it is said they had failed to use the X-rays as an aid in the diagnosis of fracture. A physician undertaking to treat a fracture is presumed to use reasonable skill, that is, the skill of those having similar training and access to the same diagnostic means. The self-reliance of the physician located away from the larger towns and cities has often rendered him a better man than his city confrere. And he has accomplished wonderful results unaided. In these days of good roads and rapid transit there is not the same grounds for treating injuries without the use of recognized diagnostic aids as in former times.

Many times the doctor with the best of intentions refrains from the use of the X-rays to save his patient's pocketbook. Many physicians charge small fees and from their intimacy with the patient desire to see him get off as lightly as possible. Is there not a disposition to carry this feeling too far? It is only when an untoward result and a suit for malpractice occurs that we see the value the patient himself places upon the physician's services. There is no work a human being is called upon to perform that is so important as the service a doctor endeavors to render. He should so look upon it, and omit no means that will help to secure the desired result. We go so far as to say that in no case of possible bone or joint injury should an X-ray examination be omitted, not only for the aid to diagnosis but for the additional advantage of having the result checked over by a second person whose findings are a matter of permanent record.

FRACTURES

The textbooks go extensively into the subject of treatment of fractures. Besides, the various medical and surgical periodicals bring the subject up to date. A feature in the management of fractures that is apt to be neglected is the management of the patient himself. Prolonged inactivity almost always produces impatience on the part of the sufferer and causes him to seek other surgical service that may be sometimes none too tactful. Probably in no other pathological condition is the prognosis so persistently demanded by the patient at the time of the accident, and to allay his fears he is often told that it will

be only so many weeks, usually a much briefer period than it ever takes for satisfactory repair to take place. Of course, in the end this means disappointment to the patient.

At no time is frankness on the part of the attending physician or surgeon more necessary. An adult patient should be made to understand the condition present as well as possible contingencies which might arise, and in the event of a child, the parent or guardian should be made to understand. Preliminary radiographs made should be demonstrated to those interested. The effect of age on the process of repair, the nature of osteomyelitis as a complication, the effect of fractures into joint surfaces, possible causes of non-union, all should be gone into where there is intelligence enough to comprehend and where circumstances would warrant explanation.

The X-ray examination will usually show up the condition of the bones and joints if the radiographs are good. The fact should not be overlooked, however, that where there is enough force to break a bone or produce a dislocation, we have more or less severe injury to the soft tissues, blood vessels and nerves and tendons which does not show in an X-ray plate. This last fact is a very important item in the prognosis of fractures and one which at the present time is impossible of determination with any degree of accuracy.

And finally the importance of clinical records made at each examination and dressing cannot be overemphasized. In no other branch of medicine or surgery are careful and intelligent records more important.

THE UPPER ROAD IN MEDICINE

(Pennsylvania Medical Journal)

*I'm going by the upper road, for that still holds
the sun;
I'm climbing thro' night's pastures, where starry
rivers run.
If you should think to seek me in my old dark
abode.
You'll find this writing on the door—"He's on the
Upper Road."*

Rev. S. N. Hutchison, in "Moments of Quiet Strength," contrasts the ideals of service and riches, and gives food for thought to those engaged in or about to pursue the practice of medicine. Medical practice cannot be considered the approach to wealth. Nevertheless, like all professions or trades, it has two roads—the upper leading to service, the lower to personal aggrandizement, unethical practice, indifference, or personal greed. The true ideal of medicine is service to a sick and suffering humanity—the upper road—though at the expense of the physical comfort and even of the needs of those who travel it.

However, the needs have become so acute in some instances, and the cost of a medical education has grown so high, that it is a question whether there is not some method of bringing about a happy reconciliation of the ideal of service and the axiom that the laborer is worthy of his hire.

To the younger generation the upper road may seem steep; yet it is worth following, for when the peak of life is reached, the traveler may look down at the hardships of his career and see them merge into the beautiful sunset of him who has served.

NEWS AND ANNOUNCEMENTS

Thereby Forming Historical Records

Dr. B. R. Hoobler of Detroit, Mich., has returned from a voyage around the world.

Dr. Walter J. Cree of Detroit has returned home after a two month's sojourn in Havana, Cuba.

You are just out of luck if you failed to pay your 1929 dues.

Remember the two-day Clinic in Detroit on June 18th and 19th.

Dr. Angus McLean who was a candidate for re-election to the Detroit Board of Education headed the polls at the election held on April 1st.

Dr. Llewellys Barker of Johns Hopkins University gave an address at the Henry Ford hospital, Detroit, April 17th.

The sympathy of our members is extended to Dr. Morris Fishbein by reason of the death of his eldest son.

The 56th annual meeting of the Northern Tri-State Medical Association was held at the Academy of Medical building, Toledo, Ohio, on Tuesday, April 9th.

While attending a recent meeting in Boston, Dr. C. B. Burr of Flint was taken with an attack of acute appendicitis. In the operation an acute gangrenous appendix was removed. Dr. Burr's progress is reported as being satisfactory.

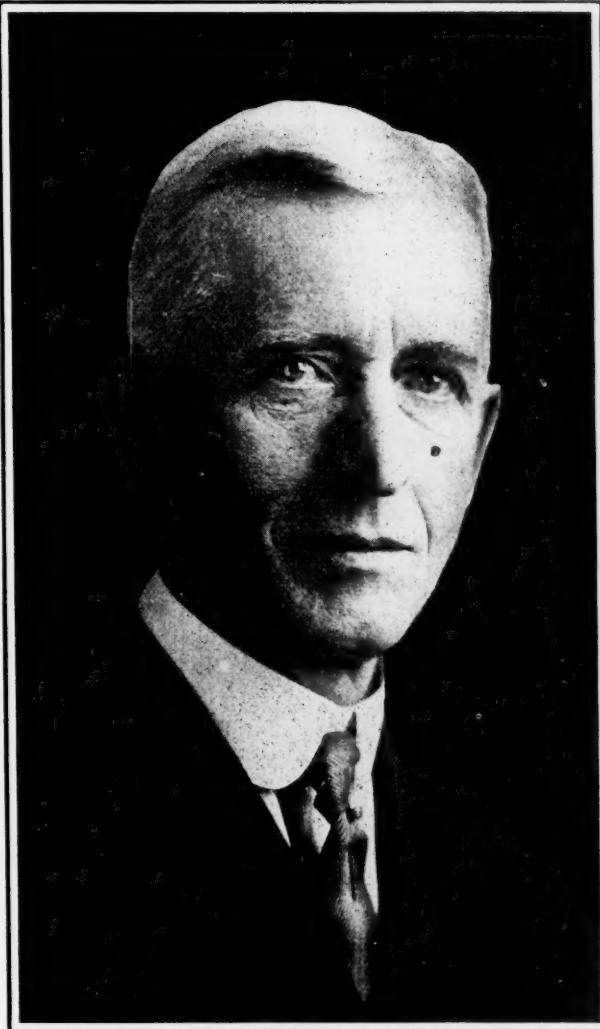
Remember the date of the annual session of the American Medical Association—Portland, week of July 8th. Some very interesting railway routings have been arranged. The opportunity of combining a sight seeing trip with attendance should cause a large registration from Michigan.

Dr. Thomas K. Gruber has been appointed superintendent of the Eloise hospital, succeeding Dr. Joseph Bennett whose death is recorded in this number of the Journal. Dr. Gruber goes to the appointment at Eloise after having served seven years as superintendent of the Detroit Receiving hospital. During his superintendency of the Receiving hospital, that institution has doubled its capacity and has been accredited rank as a class A hospital by the American College of Surgeons. Dr. Gruber is a graduate of the Western Reserve Medical school, Cleveland, Ohio, 1912. He became assistant superintendent of the City hospital, Cleveland after graduation, and in 1915 took a similar position at Harper hospital, Detroit. Dr. Gruber has been a popular member of the Wayne

County Medical Society and Michigan State Medical Society.

DR. CHARLES H. BAKER HONORED

On the night of April 24th the Detroit Otolaryngological Society gave a testimonial dinner in honor of Dr. Chas. H. Baker of Bay City. Dr. Baker is the Society's oldest Honorary member, and has always taken a deep interest in the affairs of the society and its work, and a large number of the members feel that they have honored themselves in thus honoring the doctor.



DR. CHARLES H. BAKER

Dr. Baker has been in the practice of medicine for almost fifty years, and has been active in the State Society all this time as well as an active worker for the upbuilding of all Oto-Laryngological organizations and sections.

The banquet was held in the Detroit Athletic club, and was an expression of the esteem and affection in which he is held by his fellow physicians. Few of us are able to look so far back and tell much of his boyhood days, but our spirit "warms" to the white, when we telescope over his years in medicine—all true to principle, all successful, all filled with charity to patient, and fellow physicians, all devoted to the highest ideals in the practice of medicine and find at the end of our scope a poor boy, rich only in ambition, and odd jobs. With these odd jobs and this ambition and an ever growing aspiration, we find him graduating from Hillsdale college with a Ph. B. and in the medical department of the U. of M. in 1880, graduating in 1882.

At the time of Dr. Baker's graduation, antiseptic surgery had hardly come into its own and the teacher of surgery often started a laparotomy with his favorite knife which he carried in his pantaloons pocket, without more than a preliminary rinsing, if it got even that. Bacteriology was unknown as a branch of medicine; pathology was a recommended but not required subject. Preventive medicine was just beginning to be talked of and quarantine was almost the sole weapon available against epidemics.

There was no diphtheria antitoxin; no vaccine against typhoid; malaria was due to some mysterious effluvia in the air; appendicitis was variously named typhlitis, perityphlitis and inflammation of the bowels, and was medically treated with hot or cold poultices according to the personal choice of the doctor in charge, or the bowel was locked up with opium in massive doses, even up to seven hundred grains in one case reported. Verily there were giants in those days or there would be none alive to tell the tale.

While employed in the hospital Dr. Baker had constant access to Dr. Frothingham's eye patients and enjoyed opportunities to see the doctor at work seldom enjoyed by the student of that day and he early decided to specialize in that line of medicine. An ophthalmoscope was his first purchase and as soon as he started practice he bought a trial case, both of which are still in daily use.

For seven years he practiced general medicine and surgery, the latter tending especially toward gynecology, when in 1889 Dr. Carrow received the appointment to the chair of ophthalmology and otology in the university and Dr. Baker succeeded him in his special practice in Bay City.

Two years later Dr. Baker spent several months in post-graduate work in London and Paris; again in 1900 and 1910 and was in Europe when the war came in 1913. He had the habit of going for a few weeks to the large clinics of this country once in each two years, and early joined the special sections of the A. M. A. where he contributed papers at many of the meetings.

He became a member of the American Academy of Ophthalmology and Otolaryngology by way of membership in the Mississippi Valley Society which he joined in its early days. He became a member of the Detroit Otolaryngological Society when there were but a small handful of members and about 1923 was elected to honorary membership in that society. He was President of Bay County Medical Society in 1890-1 and treasurer of the same society until tiring of a life sentence he succeeded in having the offices of secretary and

treasurer combined and automatically was deleted. He served two terms as councillor for the tenth district of the Michigan State Society and after six months absence from the council was elected President of Michigan State Medical Society in 1920.

At the meeting in Kalamazoo that year he presented the subject of State Medicine and Workmen's Compulsory Health Insurance, and aroused an interest which has not died out with the years since but is still a vital issue in medical economics.

He has taken an active interest in civic affairs and served a term on the public Library Board and two terms as member of the Board of Education of Bay City.

He served for four years as member of the U. S. Pension Board in Bay City and was a member of the Medical Advisory Board during the World War.

Dr. Burt Shurly was toastmaster and introduced the several speakers, who paid splendid tribute to the doctor's unfailing loyalty to his friends and scientific medicine. Dr. Walter Parker and Dr. Harold Wilson were the principal speakers.

DEATHS

DR. JOSEPH E. BENNETT

Dr. Joseph E. Bennett who was Superintendent of Eloise Hospital since 1921 and a member of the staff since 1913, died very suddenly of heart attack. He was 63 years of age. Dr. Bennett came to Eloise as a boy when his father, the late Dr. E. O. Bennett, became the first medical superintendent of the institution. Dr. Bennett was a graduate of the University of Michigan and at one time engaged in private practice at Wayne. Besides his wife Dr. Bennett is survived by one sister, Mrs. George P. Meyers of Detroit. He was a member of the Wayne County Medical Society and the American Medical Association.

DR. COLIN MCCORMICK

After a protracted illness beginning the day after Christmas, Dr. Colin McCormick, of Owosso, one of the oldest practicing physicians of Michigan, passed away at noon April 1, 1929. He was born in 1843.

Dr. McCormick was graduated from the University of Michigan in 1872, the year that it became a co-educational institution, and often recalled the cool reception that the women on the campus received. Beards and high hats were in vogue among students then.

Dr. McCormick came to Owosso in 1875, at a time when it was often necessary for a physician to answer calls on horseback, because of the condition of the roads. At the time he graduated one could attend the university for a year at the same cost as for one month at present, he often declared.

He is survived by seven children, including Dr. Colin C. McCormick, of Detroit, who graduated from the University of Michigan 50 years after his father. The elder Dr. McCormick was founder of the Shiawassee County Medical Society, and served as mayor of Owosso in 1883.

COUNTY SOCIETY ACTIVITY

Revealing Achievements and Recording Service

Frederick C. Warnshuis, M. D.

Secretary Michigan State Medical Society

Announcing Post-Graduate Courses in

Medicine, Surgery, Modern Laboratory Methods and Clinical Anatomy
at

Receiving Hospital, Detroit, Michigan, 8:30 to 1:00, May 27th to June 22nd, 1929

SEROLOGY—ROENTGENOLOGY

at

University Hospital, Ann Arbor, Michigan.

Auspices of

POST-GRADUATE DEPARTMENT OF MEDICINE, UNIVERSITY OF MICHIGAN

and

THE MICHIGAN STATE MEDICAL SOCIETY

POST-GRADUATE MEDICINE

The program announced in the March number of The Journal consists of the following hours of formal teaching:

RECEIVING HOSPITAL

Detroit, Michigan,

May 27th to June 22nd, 1929.

MEDICINE AND SURGERY

Case History	1 hr.
Library Research	1 hr.
Constitution	2 hrs.
Physical Diagnosis	3 hrs.
Physical Therapy	3 hrs.
Clinical Pathological Conferences.....	8 hrs.

MEDICINE

Cardiology	8 hrs.
Metabolic diseases	10 hrs.
Pediatrics	6 hrs.
Tuberculosis and other Pulmonary Conditions	8 hrs.
Syphilis	3 hrs.
Endocrinology	3 hrs.
Dermatology	3 hrs.
Infectious and Communicable Diseases	6 hrs.

Diseases of Digestive Tract	12 hrs.
Allergy	2 hrs.
Neurology and Psychiatry	10 hrs.
Diseases of Blood	5 hrs.
Preventive Medicine and Immunology	4 hrs.

SURGERY

General Surgery	30 hrs.
Orthopedic Surgery, including Fractures	12 hrs.
(Skull fractures included in General Surgery).	
Urology	8 hrs.
Proctology	7 hrs.
Thoracic Surgery	4 hrs.
Gynecology	10 hrs.
Surgery of Childhood	8 hrs.
Eye, Ear, Nose and Throat	4 hrs.
Anesthesia (spinal)	1 hr.

MODERN LABORATORY METHODS

The object of this course is to teach the laboratory methods of diagnosis in disease. Instruction will be given in the examination of urine, sputum, gastric contents, feces, blood and serous fluids. A fixed course including all these subjects has not

been established because it has been found more satisfactory to try to adapt the course to the needs of individuals. Any number of the above named subjects may be studied. The hours will be arranged for the afternoons so as not to conflict with other courses.

CLINICAL ANATOMY

For the benefit of those who desire a review in anatomy, covering the various specialties, the program will be divided into courses covering (a) head, (b) thorax, (c) abdomen, (d) pelvis and perineum, (e) anus and rectum, (f) extremities. Material will be provided for either a complete detail dissection of the parts or for local dissections in given fields, or for the practice of surgical procedures.

ANNUAL POST-GRADUATE CLINIC

In conjunction with the Alumni Association of the Detroit College of Medicine and Surgery, and the Wayne County Medical Society, the second Annual Post-Graduate Clinic will be held on the occasion of the College Commencement, June 18th and 19th. The program for this Clinic soon will be completed.

UNIVERSITY HOSPITAL, ANN ARBOR, MICHIGAN

SEROLOGY

Beginning May first and continuing throughout the year, two-week intensive courses will be given in the technic of the Kahn test. Personal advanced courses of longer periods in serology. Courses in general medical laboratory methods.

(Under the direction of Dr. R. L. Kahn, Director of University Hospital Medical Laboratories)

ROENTGENOLOGY

Six courses are offered beginning September first. With the exception of Course 1, only those with previous X-ray experience will be admitted.

Course 1—4 weeks. The study of normal X-ray anatomy.

Course 2—8 weeks. Acute and chronic bone and joint pathology.

Course 3—8 weeks. Acute and chronic pulmonary and cardiac conditions.

Course 4—8 weeks. The gastro-intestinal tract.

Course 5—8 weeks. Superficial and high voltage therapy.

Course 6—4 weeks. Ultra-violet radiation and diathermy.

(Under the direction of Dr. P. M. Hickey, Director of Roentgenological Laboratories)

If the arrangement of courses does not meet with the needs of the individual, he is invited to confer with the Director in order that his special problem may be met if possible. Registration will be in order of application.

For further details communicate with the Director of Post-Graduate Medicine, University Hospital, Ann Arbor, Michigan.

PROCEEDINGS OF THE MARCH MEETING OF THE EXECUTIVE COMMITTEE

1. The March meeting of the Executive Committee of the Council of the Michigan State Medical Society, was held in the Hotel Olds, Lansing, on March 26th. There were present:

Councilors R. C. Stone, B. R. Corbus, James D. Bruce, Henry Cook, President L. J. Hirschman, Secretary F. C. Warnshuis, Editor J. H. Dempster.

2. On motion of Corbus-Bruce, the date for the Annual Meeting of our State Society to be held in Jackson, was designated as September 17, 18 and 19th.

3. On motion of Bruce-Corbus, arrangements for the two day clinic in Detroit in June was placed in the hands of a committee composed of Dr. Bruce, the President of the Alumni Association of the Detroit College of Medicine and Surgery, and the Secretary.

4. On motion of Corbus-Bruce, the Secretary was authorized to defray the ordinary expenses of the Conference Committee on Nursing Education.

5. Dr. Dempster, the Editor, and a member of the Committee on Medical History, reported that sufficient manuscript was now on hand to publish the first volume of the history. On motion of Corbus-Bruce, the Secretary was directed to secure this manuscript and to obtain from several book publishers bids for the printing of same.

6. Dr. Kiefer, Chairman of the Legislative Commission was present and reported in detail the legislative situation.

7. The Editor and the Secretary were instructed to assume a non-committal attitude in regard to all so-called extraneous public medical meetings that are not affiliated with the County, State or American Medical Association, and which may contemplate holding one of their sessions within the boundaries of Michigan. The policy of the State Society to be impulsive

insofar as joining in with the sponsors for these extraneous meetings.

8. On motion of Bruce-Corbus, the Secretary was instructed to advise our delegates to the American Medical Association to exercise their own good judgment in regard to the candidacy of Dr. P. M. Hickey for the office of President-elect of the American Medical Association.

9. The Secretary presented a communication from the State Commissioner of Health in which he requested the advice of the Society relative to the follow-up work his commission has been requested to do in the national survey that is being made to determine the cost of medical care. On motion of Corbus-Bruce, the Secretary was instructed to write a letter to the State Commissioner of Health, same to be also signed by the President of the Society, expressing approval of his undertaking this follow-up work and according to him the endorsement of the State Society in such activity as he may manifest in this work.

10. Dr. Bruce presented a bill that had been introduced in the legislature relative to care of indigent children. It was the sentiment of the Executive Committee that the law was not conducive to the best interest of the patient or the University Hospital. The Secretary was instructed to make such representation to the Reference Committee of the House that has this bill under consideration.

The Executive Committee adjourned at 10 p. m.

F. C. Warnshuis, Secretary.

SUPERFLUOUS STAFF MEETINGS

Hospitals are developing a dangerous policy and ignoring the individual as well as collective interests of doctors when they encourage more than monthly staff meetings. In the first place staff meetings should only be concerned with medical administrative matters. Scientific papers and discussions belong and should remain as a County Society activity. Medical administrative affairs of hospitals may be adequately provided for during a single monthly session.

Scientific discussions belong to the County Society. It is not fair to the remaining group of County Society members for a minority staff group to deprive them of the educational scientific discussions.

County Society attendance and activity must not be jeopardized by frequent staff meetings that tend to discourage County Society attendance.

The individual and collective interests of doctors is far more greatly enhanced by the formulated objects and purposes of a County Society than by any influence or help extended by a hospital staff.

In Michigan, our State Society, our Councilor Districts and our County Societies are acquitting themselves in a most commendable manner of the responsibility of providing ample opportunity for post-graduate instruction. Ample provisions exist whereby one may remain abreast of scientific progress. Hospital staffs are trespassing when they assume to undertake such a role.

The recommendation is made to limit superfluous staff meetings and to remain loyal to your County Society. Staff officers who abet or inspire weekly or semi-monthly staff meetings are disloyal and are fostering a deplorable situation that has been well commented upon by the Secretary of the American Medical Association.

NOTES

Annual Meeting: September 17, 18, 19 has been selected as the dates for holding our annual meeting in Jackson. The Scientific Sections will meet on the 18th and 19th. The House of Delegates will convene on the 17th. Subsequent announcements will appear in each issue of The Journal.

Dues: Members who failed to pay their 1929 dues have been placed upon the delinquent list. Reinstatement can be obtained by payment of dues to your County Secretary.

Clinic: The program for the two day clinic to be held in Detroit June 18th and 19th will be printed in detail in the June issue.

Post Graduate Course: The four weeks of post graduate work, given under the auspices of the Post Graduate Department in Medicine of the U. of M. at the Detroit Receiving Hospital merits state-wide patronage. It is an opportunity that should not be overlooked. Interested members should arrange with Dr. J. D. Bruce, director, Ann Arbor, for enrollment.

American Medical Association: The 1929 annual meeting will be held in Portland, Oregon, the week of July 8th. Hotel reservations should be made now.

tor bill at Lansing with the purpose of passing it over the governor's opposition. It is also suggested that the osteopathic bill may be taken out of committee and passed in retaliation against the chiropractor vote, and that the professional qualifications act, setting a reasonable minimum of education for all persons who practice medicine, surgery and obstetrics, may be the only measure which never will get out of its pigeonhole.

The Governor vetoed the chiropractor bill for the simple and sufficient reason that, while sound enough in its provisions, it depended for its application upon the setting up of a licensing board provided in the professional qualifications act. As Representative Culver had held the latter in committee and refused to release it, there was no assurance that such a board would exist. Mr. Culver was himself responsible for the situation which forced a veto.

The Michigan medical profession in sponsoring the general qualifications act have not been concerned with "pathies." They have sought only a requirement that a man be well grounded in the fundamentals of scientific medicine, and the laws that govern health and disease. After that, they have made plain, they have no objection to any man's practicing whatever "pathy" he desires. The chiropractor bill complied with the provisions of the general qualifications act and had no opposition from the medical profession. The osteopathic bill does not comply with these provisions, and would permit osteopaths to practice not merely osteopathy but medicine, surgery and obstetrics without meeting the basic standards of education applied to other healers. It would permit them to change their standards from time to time without losing their full rights to practice all the branches.

To adopt this special law, creating a discrimination of lower and easier standards in favor of one "pathy", along with the chiropractor bill and kill the general qualifications act on which the chiropractor bill's regulation is based would be a vicious practical joke at the expense of the health of Michigan residents. It would be better that all the bills died for this session.—G. R. Press.

THE MONTH

Executive Committee Meeting, Bay City Conference, Details of Post Graduate Course, Program for Two Day Clinic in Detroit and Legislation—these in itemiza-

tion reflect the months activity in addition to the daily routine. Legislation consumed a very considerable portion of time, so much so as to preclude the preparation of copy for this issue. The whole story will be told in the June issue. In the meantime turn back to the April issue and perceive what your State Society is achieving by reading the article in this department on "Organizational Activity."

HOW THEY VOTED

In order that our members may know just how their Senators voted we impart the Senate Roll Call on the osteopathic bill:

Opposed:

NAYS—12		
Barnard	Engel	Person
Branson	Gansser	Richardson
Condon	Heidkamp	Sink
Cowan	Lennon	Upjohn

In favor of passage of the bill:

YEAS—18		
Atwood	Howell	Skinner
Binning	Jankowski	Stevens
Campbell	Kolowich	Turner
Conlon	Leland	Van Eenenaam
Harding	Miner	Wood
Horton	Rushton	Woodruff

Letters of thanks were sent to the senators who opposed the bill, while letters of regret were sent to those senators who favored the bill. Similar letters were also sent by the West Side Physicians' Association of Detroit. County Societies will do well if they will communicate with their senator and express thanks or regret according to how their senator voted.

PLEASE COMPLY

The Secretaries of the County Societies are respectfully urged by the Civic and Industrial Relations Committee of the Michigan State Medical Society to answer and return the questionnaire relative to "medical service in factory clinics," mailed to them on February 18, 1929. Out of 54 questionnaires mailed, only 25 have been returned to date, and without a response from each County Society it will be impossible to make a state-wide study of the problem.

Will the Secretaries of the counties who have not already sent in the questionnaire kindly mail it at once to Dr. Harrison S. Collisi, Chairman of Civic and Industrial Relations Committee, 1522 Grand Rapids National Bank building, Grand Rapids, Michigan.

OSTEOPATHY

"Osteopathy is an outgrowth from the primitive conditions prevailing on our western frontier in

the period preceding our Civil War, when educated physicians were few, opportunities for rational treatment were fewer, and boldness in assertion and action counted far more than exact conformity to scientific truth. The founder of osteopathy was one of the rude, itinerant practical bone-setters, probably often clever in his attitude toward the sick. Though unlettered, he was possessed of a positive philosophy that found a sympathetic hearing in the home of many an unlearned frontiersman, who would have been ill at ease under the ministrations of one trained in the nice theories of academic medicine. Osteopathy was and still is full of unfounded assertions regarding the normal functioning of the bodily structures, and the nature and proper methods of cure of disease, though of late years its more enlightened practitioners appear to be endeavoring to harmonize its practices with certain accepted scientific principles. It speaks much of "lesions," by which it means, not the commonly accepted pathological idea of morbid changes, but rather "any structural perversion which by pressure produces or maintains functional disorder." Of all parts of the body subject to lesions the "spine" is of fundamental importance, and "it is only in occasional cases of disease that no treatment is given to it." Treatment consists chiefly in correcting the structural perversion by manipulation with the hands, and thus removing the pressure on the functionally disordered organs or on nerves and blood vessels supplying them. The osteopath serenely, with a singly stroke of the hand, waves away the facts of scientific pathology. Says the prophet:

"I have concluded, after twenty-five years' close observation and experimenting, that there is no such disease as fever, flux, diphtheria, typhus, typhoid, lung-fever, or any other fever classed under the common head of fever. Rheumatism sciatica, gout, colic, liver disease, nettle-rash, or croup, on to the end of the list of diseases, do not exist as diseases. All these, separate and combined, are only effects. The cause can be found, and does exist, in the limited and excited action of the nerves only, which control the fluids of parts or the whole of the body." The cause of all disease is a "partial or complete failure of the nerves to properly conduct the fluids of life." *One can with difficulty suppress a feeling of admiration for the audacity with which time-honored scientific facts and principles are thus put aside. Osteopathy undoubtedly effects cures, but so does the medicine man of the savage tribe.*"

—Lee's Scientific Feature of Modern Medicine.

MASON COUNTY

At a meeting of the Mason County Medical Society held April 18 the following officers were elected:

President—E. Geo. Gray, Ludington.

Secretary-Treasurer—Lois W. Switzer, Ludington.

E. Geo. Gray, Secretary.

MONROE COUNTY

Monroe County Society held its regular meeting, March 21, 1929. There was a large attendance. Dr. E. C. Davidson, General Motors Building, Detroit, gave a very interesting talk on "The Treatment of Burns in Children." He explained the method of the tannic acid spray. Method and results were shown by means of lantern slides.

F. Ames, Secretary.

GRAND TRAVERSE-LEELANAU COUNTY

Regular meeting of the Grand Traverse-Leelanau County Medical Society was held at the J. D. Munson Hospital on April 2, 1929.

The minutes of the March meeting were read and approved.

After the Secretary read the various letters from the State Secretary regarding medical legislative activities during the past month, he was instructed to write to Representative Culver and our own representatives in regard to the Osteopathic Bill.

Dr. H. B. Kyselka then gave a very fine talk on "Childhood Tuberculosis," illustrated by lantern slides from the Michigan Tuberculosis Association.

Dr. Minas showed many X-ray plates of both childhood and adult tuberculosis and other chest conditions.

The meeting proved very instructive with all members present participating in the very active discussion which followed.

E. F. Sladek, Secretary.

MACOMB COUNTY

The April meeting of the Macomb County Medical Society was held on Monday, April 8 at 12 o'clock, noon, at the Colonial hotel. The meeting was called to order by the President and the Secretary called the roll. There were 22 members present.

Dr. Moore reported for the Membership Committee, favorably in the transfer application of Dr. R. Lynch, from Mayne County Medical Society.

Dr. Bower, the President, urged every member to write to his Senator and Representative regarding the Osteopathic Bill.

The Secretary then read the correspondence.

Dr. Guy L. Kiefer, Commissioner of Health, was the speaker. He gave a detailed outline of "The County Healty Unit," which he advised should be adopted by County Societies throughout the state.

After some discussion by members, and questions and answers, the following resolution was made by Doctors Walpon and Croman, Sr.:

"That Macomb County Medical Society is favorable to the establishment of a County Health Unit."

This resolution was adopted by a vote of 12-10.

Meeting adjourned at 2:00 p. m.

J. N. Scher, Secretary.

JACKSON COUNTY

The March meeting was held Tuesday, March 19, in the English room of the Elks Temple. A chicken dinner was partaken of, following which the meeting was called to order by President Hungerford.

The Secretary gave a brief outline of the State Society's political activities. He urged that all members co-operate in carrying out the directions of the State Secretary.

The meeting was then turned over to Dr. Cox, Chairman for the day. He introduced as the speaker of the evening, Dr. Abraham Levinson, who is connected with the department of pediatrics of Michael Reese Hospital and Northwestern University Medical School, Chicago.

Dr. Levinson gave an extremely interesting as well as scientific talk on Meningoceleus Meningitis. He stressed the necessity of spinal puncture in cases of convulsions and urged that we all use

Meningococcus serum freely and abundantly in these cases.

All in all Dr. Levinson's talk was one of the best and most instructive that Jackson County Society has ever had. His paper was discussed by several doctors present.

The meeting then adjourned.

Attendance 25.

BERRIEN COUNTY

The Berrien County Society held its April meeting in Benton Harbor Thursday evening, the 28th, at the Congregational church parish hall.

A complementary dinner was served at 6:30 for the speaker of the evening, Dr. Fishbein, editor of The Journal of the A. M. A. Sixty places were laid and there were many visitors from neighboring counties.

Following the dinner a short business meeting was held at which the application of Dr. R. L. Ingleright of Niles was voted upon for transfer of membership from the O. M. C. O. R. O. to the Berrien County Society. Dr. Fishbein then addressed the Society with a short talk on the present status of medicine, dealing with the high cost of medical care and so-called group or clinical practice.

At 8:15 Dr. Fishbein addressed a public audience of about 200 people, taking as his topic, "Fads and Quackery in Medicine."

This talk was more or less a dissertation on the evolution of cults, from early inscriptions on Greek temples, through Mary Baker Eddy and on to the present day chiropractic with their mechano-therapy and salesmanship.

Dr. Fishbein's droll humor kept his audience in laughter. His facts and statistics and method of delivery kept his audience in the closest of attention. The newspaper write-ups and communications in the local press made topics of conversation for a week following. Even anonymous letters were sent to the Secretary commenting on the persecution of the cults.

If you want to start something in your locality get Dr. Fishbein to give you a public talk and if they never heard of your Society before, you will have plenty of publicity in a short time.

The Berrien County Society wish to extend their yearly invitation to the members of the State Society who expect to visit this county, during Blossom Week in May to call on us. We will be glad to entertain and direct you and do everything in our power to make your visit worth while.

W. C. Ellet, Secretary.

LENAWEE COUNTY

The Lenawee County Medical Society met at "The Tavern" in Blissfield on the evening of March 21st. Dinner was served at 6:30, 19 members sitting down to a bountiful repast of roast lamb and all the "fixins." At the head of the table was our President, Dr. Marsh, and opposite him was our Honorary Member, Dr. R. M. Eccles of Blissfield. Dr. Eccles recently celebrated his 50th anniversary of practice in Blissfield, and during that time he has continuously deserved and won the love of everybody with whom he has come into contact, both within and without the profession.

A letter was read from the State Secretary, who asked the Society to take action concerning the new Osteopathic Bill (Senate No. 239). The Secretary was authorized to write a letter of protest

to the Chairman of the Public Health Committee of the Senate.

After the close of the business meeting, Dr. Howard Cummings of Ann Arbor gave a very instructive talk on "The Practical Treatment of Eclampsia." The principal methods of treatment were:

- 1.—Elevation of the foot of the bed.
- 2.—Narcotization with morphine and chloral hydrate.
- 3.—After narcotization, colonic washings with 3 or 4 gallons of water at a temperature of 110, and stomach washings, leaving a few ounces of magnesium sulphate in the stomach.

- 4.—A dark and quiet room.
- 5.—Intravenous injections of 20 c.c. magnesium sulphate every 3 or 4 hours as the case demanded, or intravenous injection of glucose, especially well used after bleeding if the patient is plethoric.

Every one of the members present thanked Dr. Cummings for his thorough and delightful presentation of the subject.

C. H. Westgate, Secretary.

KALAMAZOO COUNTY

The regular meeting of the Academy of Medicine was held March 19th.

Dinner was served to about 55 members of the Society. There were only about 37 cards returned, as usual many came who had not signified their intention.

An afternoon dinner talk was given by Rev. G. W. Plews on "Amusing Experiences" in the Canadian army during the world war.

Dr. Lewis J. Hirschman of Detroit, President of the State Medical Society gave a very instructive talk on Fistula in Ano. His method of outlining these fistula and the surgical treatment necessary to bring about results was very well detailed and demonstrated by lantern slides. His findings indicated that our old conception of most of these being tubercular was entirely erroneous.

His paper was discussed by Doctors A. S. Youngs, C. E. Boys, B. A. Shepard and J. B. Jackson.

The business session was called to order by the President, Dr. Ward E. Collins.

The minutes of the previous meeting as printed in the bulletin were approved.

Dr. Thompson called the attention of the members to the coming election at which time an appropriation for the enlargement of Fairmount Hospital would be voted upon. He especially wished that Dr. L. J. Crum would remember election day.

Report of Committees.

Dr. Rush McNair reported the findings of his committee on M. A. Francoise and the family medical service. The report on the former was reversed and that on the latter was adopted.

Dr. Boys moved that the Academy express to the hospitals our gratification of their stand in regard to patients from the family medical service. Seconded. Carried.

Letters from Dr. Warnshuis regarding pending medical legislation were read and discussed. The legislative committee was given the power to formulate telegrams and letters and send them to the proper ones at Lansing.

A letter from the Child Welfare League was read. A committee to comply with their request has already been appointed. Those on this committee are Doctors Stewart, Hoebke, Westcott, Crum and A. H. Rockwell.

Dr. F. Elizabeth Barrett, chairman of the

Public Health Committee was asked to look after the arrangements for the May pre-school clinic.

Dr. D. D. Lyons of Wayland, Mich., whose application for membership was read at the last meeting and passed by the board of censors was unanimously elected to membership.

Meeting adjourned.

GENESEE COUNTY

Meeting of Genesee County Medical Society held at Hurley Hospital, March 6th, 1929. President Benson in the chair. Minutes of the last meeting read and approved. A letter concerning the organization of a women's auxillary and one concerning the present status of industrial medicine was read by the Secretary.

Dr. B. E. Burnell moved that the Secretary correspond with Mrs. Guy Kiefer in regards to the functions of a women's auxillary. Motion seconded and passed. Dr. Carl Moll moved that the President elect a committee to investigate the organization of industrial medicine in Flint and report same to the State Secretary. The following committee was appointed: Dr. Winchester, chairman; Dr. Treat and Dr. Childs. A committee composed of Dr. B. E. Burnell, Dr. Don Knapp and Dr. M. S. Knapp was appointed by the President to draw up a resolution of sympathy for Dr. O. W. McKenna in his recent bereavement.

Dr. M. W. Clift of Detroit gave a talk on "The Value of X-ray Findings in Mastoid Disease."

Meeting adjourned.

Meeting of Genesee County Medical Society held at Hurley Hospital, March 20th, 1929. President Benson in the chair. Minutes of the previous meeting read and approved. Dr. C. Moll moved that the Genesee County Medical Society buy a full page ad in the year book published by the graduating nurses of Hurley Hospital.

A letter concerning Senate Bill 239 introduced by the osteopaths was read by the Secretary. Dr. Winchester moved that the letter be referred to the legislative committee and that they oppose its passage by whatever means derived necessary. Motion seconded and passed.

Dr. Winchester reported the results of the legislative committee's investigation of Dr. Ard's treatment of diabetic patients. Dr. Tupper moved that this report be accepted by the County Society. Motion seconded and passed.

Dr. F. A. Coller of the University Hospital gave a talk on "Toxic Goiter." Discussion followed.

Meeting adjourned.

Meeting of Genesee County Medical Society held at Hurley Hospital, April 17, 1929. President Benson in the chair. Moved that reading of the minutes of the last meeting be dispensed with. Seconded and passed.

Telegrams to and from Dr. Burr read by the Secretary. Dr. D. Knapp moved that these telegrams be spread in minutes of Genesee County Medical Society. Motion seconded and passed. Dr. Winchester reported the findings of the committee investigating industrial medicine in Flint. Dr. Winchester moved that the report be accepted by Genesee County Medical Society. Seconded and passed. Dr. Cook reported on the activities of the legislative committee concerning chiropractic and osteopathic bills. Dr. Tupper moved that Dr. Cook's report be accepted. Motion supported and passed.

Dr. Marshall moved the Genesee County Medical Society indorse appointment of Dr. C. Moll for

new member of Health Board. Motion seconded and passed.

Dr. F. W. Baske gave a talk on "The Surgical Diabetic." Discussion followed.

Meeting adjourned.

M. S. Chambers, Secretary.

MARQUETTE-ALGER COUNTY

The following extracts are taken from the minutes of meetings of the Marquette-Alger County Medical Society, and are given to you in the hope that the information here given will be found helpful in your practice. Only a few of the more important papers are here outlined.

Dr. C. W. Hopkins of Chicago, Chief Surgeon for the Chicago, Northwestern Railroad, spoke on "Fractures".

Dr. Hopkins emphasized the importance of after treatment and by-treatment and advised as little open operations as possible. In discussing fractures of the finger he emphasized, (1) always an X-ray; (2) use a roller bandage and not a straight splint; (3) X-ray again to see if fragments in line; (4) remove splint and roller bandage and commence passive motion about the second week —then put up in a modified splint and motion every other day for another week. He advised always a lateral as well as an anterior-posterior X-ray picture.

In open operations he uses the Vanadium plate and he recommended early removal of the plate —as early as third week.

He recommended reduction of many fractures under local anesthesia. He injects 100 c.c. of $\frac{1}{2}$ per cent novocain into area of fracture, waits 10 minutes, and is then able to work on the part for hours if necessary.

In compound fractures with tissue maceration or in any condition where infection is present or liable to occur, he uses hydrogen peroxide acidified with $\frac{1}{2}$ per cent acetic acid for irrigation—using two tubes, an in-going and an out-going tube. At the same time he gives two grains of sodium iodide T. I. D. by mouth. He states that this eliminates nascent iodine in the wound and prevents infection. At the same time he also restricts the diet, especially the proteins, as this causes acidosis. If a hematoma is present it will absorb but also acts as a foreign body, so drain when you can.

He advised early reduction of fractures—the earlier the better as there will be less fibrin around the fracture and no great amount of exudate is thrown out. So if the fracture is not compounded, reduce early. He advised the aeroplane splint in shoulder joint conditions, as this position causes the glenoid cavity to be filled with the head of the humerus and thus we get better mobilization.

In cases of scaphoid or carpal bone fractures it is better to remove them at once because usually the blood supply and small ligaments are traumatized and the bones become honeycombed.

He emphasized the importance of the character of the violence causing the fracture and advised an X-ray at once and repeat after three weeks or so, as fracture may be missed immediately following injury. This is especially true of the skull and is explained by the fact that in time, absorption has taken place and fracture then readily discernible. A blister or bleb at the point of the impact is very diagnostic of fracture."

* * * *

Dr. Frank Smithies of Chicago, Professor of Internal Medicine of the University of Illinois

Medical School, who spoke on "Gastric Hemorrhage, Its Significance and Treatment"—

"The first case report was with hemorrhages from the stomach, kidneys and lungs, which proved to be a case of Hemolytic Endocrinitis. Another case presented the picture of gastric hemorrhage associated with the menstrual cycle, and he emphasized the point that in females with bleeding—vomiting blood—be sure to inquire into the possible relationship with the menstrual cycle. Another case developed numerous gastric hemorrhages which necessitated splenectomy, cholecystostomy and choledocho-lithotomy and finally fatal hemorrhage—all caused by amebiasis. Another case vomited a red pigment with no red blood cells—due to destruction of blood by distillate gases. This patient was cured by changing the occupation and giving iron and arsenic. A case of hemorrhage due to a blow in the epigastrium caused death in two hours. A case of a man in middle age, over weight, heavy eater and drinker who had gastric hemorrhage with hemorrhage into the pancreas, and hypertension and arteriosclerosis. He pointed out that often in such cases of heavy eaters and drinkers with sudden death a diagnosis is made of "acute indigestion," but that in most cases we have an acute perforated ulcer or acute pancreatitis. Acute indigestion does not end in sudden death. The last case was of a man with several recurring hemorrhages who was operated upon for duodenal ulcer—later had four more hemorrhages during the next two years—then developed rapid pulse, four-plus blood in the stool and with the hemoglobin going down and pulse steadily climbing and in a state of exhaustion. Abdominal exploratory was advised at which time a small mass was found in the duodenum which looked like the scar of an old ulcer. In spite of transfusion, the patient continued to bleed and in two weeks developed obstructive symptoms with severe pain and bleeding. A second operation was performed and it was found that this mass had grown in size, extending to the stomach and with nodules in the liver and peritoneum. This case developed a large inoperable malignancy from a small benign duodenum ulcer. Statistics show only 0.7 per cent of duodenal ulcers developing malignancy, and practically all cases extend to the gall tract or pylorus.

In summarizing these cases, Dr. Smithies gives his procedure in a given case of stomach hemorrhage. First—get a brief history of what has happened and examine the patient from head to foot. Be sure to eliminate occupation, picture-film contacts, vicarious bleeding in menstrual cycle, obstruction to cardia, endocarditis, splenic anemia, and trauma. After excluding these, about 85 per cent of gastric hemorrhage occur during the course of gastric or duodenal ulcer or gastric cancer. Cancer does not bleed copiously but rather seeps blood, while the ulcer is liable to bleed freely. Gastric ulcers bleed more freely than duodenal ulcers and are more serious.

Duodenal ulcer occurs four times as often in the male as in the female. Eighty per cent of peptic ulcer are duodenal, and hemorrhage is not immediately fatal, though one cannot tell whether hemorrhage will or will not be fatal. The mortality of the first gastric hemorrhage due to ulcer is only 3 per cent. Each succeeding hemorrhage is more serious as there is more tissue destruction with a deeper ulcer crater and there is more liability to perforation.

All cases of hemorrhage are potentially a surgical case, and he advises the patient when in

good condition between attacks and no symptoms, to be operated upon.

Never make the diagnosis of peptic ulcer under the age of 31 unless the person has had one or more gross hemorrhages, because in 2,800 cases of hyperacidity with stomach upset, etc., only one in 11 had ulcer, the others being cases of pyloric spasm associated with appendix, gall bladder or gastritis. Must have definite X-ray evidence after relaxation of spasm with belladonna.

He stated that peptic ulcer was not a disease of adolescence as stated in some text-books and that belching of gas, sour taste, etc., does not mean hyperacidity but rather hypermotility. In pyloric spasm we have an interference of the systole-diastole of digestion and we get acids passing to the mucous linings which are accustomed to alkaline reactions, and this change causes an irritation which in turn produces spasm and distress. Any acid of the stomach out of its normal position—is the hyperacidity syndrome.

With reference to occult blood tests, Dr. Smithies stated that a positive test means nothing unless the patient has been on the correct diet for three days. A positive test means that there is a bleeding point somewhere between the lips and the anal ring. A negative test means that there is no bleeding between the lips and anal ring and always tells us there is no malignancy in the alimentary tract.

Treatment—A hypothetical case of a patient brought in bleeding with a history of hemorrhage. After a diagnosis of ulcer is made the question arises, "Is the ulcer perforated?" If so, we will get local tenderness in some part of the abdomen—a localized protective spasm somewhere. If peritoneal irritation is present and if the hemorrhage occurred longer than ten hours, then let him alone! If when we see him he is exanguinated, with feeble pulse and lowering hemoglobin, then operate at once! In other words, up to ten hours—operate. If after ten hours, treat expectantly. The usual routine treatment outlined as follows:

(1) Put to bed—elevate foot of bed and put on right side if possible.

(2) Medicine—Give morphine $\frac{1}{2}$ grain with Atropine 1/400 grain intravenously. This is given to slow the heart and lower the blood pressure of the capillary bed. Repeat this in one hour if necessary for effect.

(3) If retching and only occasional vomiting then wash out the stomach with normal saline—temperature 110. This gets rid of clots which cause irritation and the heat stops hemorrhage. This empties the stomach and causes rest.

(4) No ice or cold bags on abdomen unless suspect a perforation and then only over point to localize.

(5) Use heat on abdomen—large fomentations and keep hot by a lamp, because heat

- (a) counteracts shock,
- (b) has a derivative action,
- (c) prevents painful spasms.

(6) Absolutely nothing by mouth. If thirsty, give fluid by rectum (high caloric enemata) consisting of glucose syrup; 50 per cent alcohol 1 oz.; salt solution 8 oz., and give by drop method. Also let patient chew wax or gum if thirsty, as this causes a flow of saliva. Do not give anything by mouth, until three days after hemorrhage ceases, which is evidenced by—

- (a) falling of the pulse rate,
- (b) increase of blood pressure,
- (c) temperature approaching normal,
- (d) hemoglobin coming up.

The stools tell us very little as they may be black for some time following hemorrhage. Twenty minimis of Addrenalin with 10 c.c. water injected slowly into a vein may reach the capillary bed and cause contraction and stop bleeding. Coagulose and other styptics may be useful but only clear your own conscience.

With the patient approaching the second day, and hemoglobin about 40 per cent, R. B. C. 2,000,000 or lower—the patient is about stationary. Now, what shall we do? By all means do a transfusion but not with citrated blood, but with viable fluid tissue. Normal blood is the best coagulant and the greatest agent against shock and repair of damaged tissue. Transfuse as long as the patient needs blood—until blood is up to 4,000,000 or more. Do not leave transfusion to the last resort but give immediately. If we get anuria, transfusion causes a diuresis. Usually, this is all that is done for these patients. Diet—80 per cent carbohydrate diet. Small quantities of warm carbohydrate liquids made from flour, rice, etc., one ounce every hour and increase as patient's tolerance permits. Do not give milk, eggs or other proteins as this increases the HCl and also because protein food stays longer in the stomach. Do not give alkalis. Gradually build up the carbohydrate diet and maintain for six weeks a 70 per cent carbohydrate preponderance. Get in the vitamins, such as meat juices, carrots, etc. Also, give cod liver oil.

Salvarsan, 1.5 grams intravenously every four days, for about six injections. This is much better than Fowlers Solution. Give iron in the form of malt and iron.

Do not X-ray while we have bleeding as this may cause death by perforation. Do not X-ray until four weeks after hemorrhage has stopped.

Russell L. Finch, Secretary.

COMMUNICATIONS

Boston, Mass., April 20, 1929.

My Dear Dr. Warnshuis

Dr. Burr wishes me to express to you his sincere thanks for the very beautiful flowers sent to him from the Michigan State Medical Society. Also to you for your kindness. He has been seriously ill, but is now on the road to recovery I hope.

Again thanking you, I am

Gratefully yours,

Mrs. C. B. Burr

Annette W. Burr.

Ann Arbor, Mich., April 2, 1929.

Dr. F. C. Warnshuis, Secretary

Last summer you printed a review of the Michigan Hand-book of Hospital Law which was published by the Michigan Hospital Association. At that time these books were being sold at \$2 per copy, which was practically the cost of publication. We have a fair supply of them left and

will be glad to dispose of them at \$1 per copy as we would rather have them in service than to keep them on our shelves. A notice to this effect might be of interest to the readers of your magazine, and at the same time it would help us to dispose of our surplus.

Anything you can do to assist us in this matter will be appreciated.

Very truly yours,
Robert G. Greve, Secretary.

YELLOW FEVER MARTYRS GET FEDERAL PENSIONS

The House bill providing pensions of \$125 per month for army officers and enlisted men, or their widows or heirs, who took martyrs' parts in the yellow fever investigations carried on by army doctors in Cuba in 1900 has been passed by the Senate and now goes to the President for signature. There are 14 of these men, twelve of whom were privates. A pension for Mrs. Walter Reed, wife of Major Reed, who was in charge of the yellow fever work in Cuba, was provided years ago, but recent efforts to increase this amount above its present amount of \$150 per month failed in the House, the chairman of the Pensions Committee there maintaining that such pensions must be held down within "reasonable limits." The bill provides that the Secretary of War shall publish their names annually in the Army Register as a roll of honor, and that each of the men or their heirs shall be presented with a gold medal. The Secretary of the Treasury is to decide upon the design of these medals and \$5,000 is to be appropriated for making them.

The names to be carried on the roll of honor are: Walter Reed, James Carroll, Jesse W. Lazear, Aristides Agramonte, James A. Andrus, John R. Bullard, A. W. Covington, William H. Dean, Wallace W. Forbes, Levi E. Folk, Paul Hamann, James F. Hanberry, Warren G. Jernegan, John R. Kissinger, John J. Moran, William Olsen, Charles G. Sonntag, Clyde L. West, Dr. R. P. Cooke, Thomas M. England, James Hildebrand, and Edward Weatherwalks.—Science Service.

GNATS THREATENING SIGHT OF CALIFORNIA CHILDREN

Fifteen hundred children in the Coachella Valley Union High school, at Thermal California, suffering with serious conjunctivitis, or pink eye, due to the ravages of the California eye gnat, have caused the House Appropriations Committee to insert an item of \$12,000 in the Second Deficiency Bill, for the purpose of allowing experts from the U. S. Bureau of Entomology to go out there to see if they can destroy this pest.

The gnat, known scientifically as *Hippelates pujio*, is said to have increased to an alarming extent in the Coachella Valley in the last five years. It hovers in swarms about the eyes, noses and mouths of persons and stock. Small children are especially helpless against it. Over one-half the school children in this region now have serious eye trouble caused by the gnat, and ten per cent of them have contracted chronic trachoma.

Common house flies, according to Dr. Marlatt, act in Egypt somewhat in the manner of this Coachella Valley gnat. They will swarm about the eyes, causing all sorts of eye troubles, and sometimes blindness.

Florida is also having some trouble with eye gnats, he said.—Science Service.

THE DOCTOR'S LIBRARY

Offering Suggestions and Recommendations

KAUFMANN'S PATHOLOGY—Reimann. Three Volumes. Price \$30. P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa.

Kaufmann's Pathology is an English translation of the well-known extensive German text (to which have been added appropriate recent progress notes and additional illustrations) by Stanley P. Reimann, M. D., Pathologist, Director of Research Institute, Lankenau Hospital; Assistant Professor of Experimental Pathology, Graduate School, University of Pennsylvania.

In German this book has reached the eighth edition. The recent editions have been enriched in many directions, particularly from experiences acquired during the war. The author, Dr. Edward Kaufmann, is professor of General Pathology and Pathological Anatomy and Director of the Pathological Department, University of Gottingen. The illustrations adorning the text are numerous, in all 1,072, including 100 special drawings made by the Staff Artist of Lankenau hospital, Philadelphia. The text is with some few exceptions well arranged with appropriate heavy type headings, and divided into three volumes, and thirteen chapters. In the first chapter there is a discussion of the Organs of Circulation; chapter two, Blood and Lymph; chapter three, Respiratory Organs, and chapter four, Digestive Organs. This latter chapter comprises 816 pages. At the beginning of each of the three main divisions of volume I, one to five pages are devoted to a discussion of the fundamental normal and malformative architecture of the system described. These outlines are unusually good.

It is a bit strange, except from a developmental standpoint, to find under Respiratory Organs in chapter three the discussion upon the thymus, thyroid and parathyroid. The section upon pancreas is found under the digestive system, and that upon adrenals in chapter seven, preceding the urinary system. A very much better assignment would have grouped the endocrine units under one system since much is to be gained by using the concept that there are interrelative values to be gained especially in clinical and pathological interpretations.

One finds more than the usual satisfaction in reference readings upon the rarer pathological changes, for example: Acute Yellow Atrophy of the Liver, or Necrosis of the Pancreas, or Parasites of the Liver, etc. But marked disappointment is felt after perusing the discussion upon the pathology of the Appendix-V, which will hold a leading interest among a large number of readers from the surgical specialties.

Chapter five (226 pages) is exceptionally well written, especially the preluding descriptions upon Resorption, Canalization, Bone Disappearance, Normal Structure, New Bone Formation, Regressive Changes, etc.

The chapter upon sex organs has 83 pages devoted to the male organs and 263 pages to the female.

To practitioners who go to Germany, Austria, and Hungary for gynecological pathology, and have but little fluency in the German language, this chapter, if carefully mastered, will be better

than a post graduate course in German speaking countries, for here one finds the German viewpoints faithfully presented.

In the same section, readers of American literature will be surprised to find no reference to Endometriosis, a condition now so well-known, owing especially to the writings of Sampson and others.

Under the section Diseases of the Placenta, on page 1729, a subheading is worded "Views Concerning the Origin of the So-called White Infants." This is an oversight of the proof-reader who should have spelled the word infants "infarcts."

Chapter ten in volume III is given to the Nervous System. Here one is disappointed in not finding a section upon sinus and mastoid infections; the sources of such a large percentage of acute brain pathology. In chapter three of volume I, page 296, there is a very insignificant discussion of Inflammations of the Accessory Cavities of the Nose. Otitis Media and Mastoiditis in relation to brain infections is passed with only a brief reference.

To some readers who want a single dogmatic statement upon all undecided questions the painstaking presentation of diverting views will be tiresome, but to those of inquiring and scientific attitudes it will be satisfying to have this means for economy of time, making it unnecessary to consult other authors.

The Appendix (Bibliography) contains a very meager number of references to the literature in English, but an extensive number of references to the German literature.

The illustrations throughout the book, taken from the original text, are not excellent; those added by the translator are unusually good.

—JAMES E. DAVIS

RECENT ADVANCES IN OBSTETRICS AND GYNAECOLOGY—Aleck W. Bourne, B. A.; M. B., B. Ch. (Camb.) F. R. C. S. (Eng.). Second edition, 67 illustrations; 370 pages; price \$3.50. P. Blakiston's Son & Co., Philadelphia, Pa.

This series of monographs fills a valuable place in the medical library supplementing as it does, the more extended treatment of the various subjects. The present work will not supplant the larger and more complete text books on Gynaecology and Obstetrics. It does, however, contain the recent advances in the subjects unless the text book is very recent. Among the subjects treated in obstetrics are: Ante-Natal Care; A Review of Maternal Mortality; Remarks on Ante-Partum Hemorrhage; Puerperal Sepsis. And in gynaecology: The General Progress of Gynaecology; Sterility and the Fallopian Tube; The Ovarian Hormones, and The Use of the X-rays in Obstetrics and Gynaecology.

THE QUACKS OF OLD LONDON—C. J. S. Thompson: 353 pages; 35 illustrations. Price \$4. 1929. J. B. Lippincott Company, Philadelphia, Pa.

The quack like the poor we have always with us. He preys upon the weakness and credulity of human nature. The nature of quackery is determined by the age. This work deals with

quackery in London during the Sixteenth and Seventeenth centuries. Very little has been re-ordered before the Sixteenth century. The writer has given us a very entertaining and enlightening volume. "Medicine" he says, "appears ever to have attracted pretenders and it is the art in which they have been most successful. There have always been unfortunate sufferers in despair ready to become the dupes of charlatans and so in the Seventeenth century, we find the ranks of quacks were increased by a host of boasting rogues and cunning rascals, who flocked to London and soon became prominent in the social life of the time." They were, we are told, patronized by all classes from the king to the peasant. Then as now they thrived by advertising. The writer has presented his subject matter in such a way that the reader's interest is sustained to the end.

PROCTOLOGY—A treatise on the malformations, injuries and diseases of the rectum, anus and pelvic colon. Frank C. Yeomans, A. B., M. D., F. A. C. S., Professor of Proctology, New York Polyclinic Medical School; Fellow and Past President, American Proctologic Society; Attending Surgeon, New York Cancer Institute; Proctologist, the New York Hospital. With 417 illustrations and 4 colored plates. Cloth \$12, net.

Recognizing the growing importance of proctology as a specialty, Yoemans has produced a work which will assist materially in increasing the interest of every practitioner of medicine in this special field. From his large and varied experiences in large metropolitan clinics, as well as in private practice, he has presented a fund of information of great value.

He has drawn freely upon the work of Tuttle and other authors whenever necessary to make his work complete. The illustrations are clear and many of them original. The non-operative treatment of many of the minor diseases is detailed and the operative technic well described. It is a welcome and valuable addition to the library of any one who wishes to keep up to date in the specialty of proctology.

ATLAS OF THE HISTORY OF MEDICINE, ANATOMY—J. G. DeLint, Lecturer on the History of Medicine at the University of Leiden. Forward by Charles Singer; Price \$6. Paul B. Hoeber, New York.

This book consists of a series of descriptive prints illustrating the History of Anatomy. These illustrations are accompanied by complete verbal description and are arranged chronologically in sections as follows: (1) From the Earliest Times to Vesalius. (2) Vesalius. (3) From Vesalius to the Beginning of the Eighteenth Century. (4) Anatomy in the Eighteenth Century. (5) Anatomy in the first half of the Nineteenth Century. (6) Widening of the Field of Discovery. This work will be found a valuable addition to one's medical library, especially the book collection of the historically minded.

RECENT ADVANCES IN NEUROLOGY—W. Russell Brain, M. A., D. M. (Oxon) M. R. C. P. (London) and E. B. Strauss, B. A., B. M., B. Ch. (Oxon) M. R. C. P. (London); 38 illustrations; pages 411. 1929. Price \$3.50. P. Blackiston's Son & Co., Philadelphia, Pa.

This little book contains an abundance of interesting reading for both the clinician and the student of psychology. It is auxiliary text book of applied neurology. We are coming more and more to see the importance of an adequate understanding of the nervous system in the study of all pathological conditions whether surgical or purely clinical. The background of English physiology should go a long way to gain the confidence of the reader of this monograph.

THE MEDICAL CLINICS OF NORTH AMERICA—(Issued serially, one number every other month.) Volume 12, No. 5. (Southern Interurban Clinical Club Number.) Octavo of 306 pages with 40 illustrations. Per Clinic year, July, 1928 to May, 1929. Paper, \$12; Cloth, \$16 net. March 1929. W. B. Saunders Company, Philadelphia and London.

This number of the medical clinics has a distinctly southern flavor not only in the geographical distribution of the contributors but in some of the subjects as well. Among the subjects presented are Pellagra by Dr. C. C. Bass; Tropical Sprue Epidemic in Tennessee by Dr. B. W. Fontaine; Dietetic Difficulties in the South by Dr. Fred W. Wilkerson. The remaining subjects are of a general nature. On the whole the volume measures up to others of the series which we have reviewed from time to time.

THE ELEMENTS OF THE SCIENCE OF NUTRITION—Graham Lusk, Ph. D., Sc. D., Professor of Physiology at the Cornell University, Medical College, New York City. Fourth edition, reset. Octavo of 844 pages. Cloth \$7.00 net. W. B. Saunders Company, Philadelphia and London.

In the fourth edition of this book, the author has made many changes and important additions to the facts of metabolism. The chapter dealing with diabetes mellitus is discussed minutely as well as the influence of insulin on oxidation. He also discusses from a scientific and research point of view, the influence of the thyroid and other internal secretions, in regard to their effect on metabolism and the science of nutrition. The author, as in previous editions of this book, reviews the scientific investigations upon which rest the present knowledge of nutrition, health and disease. The book is a very valuable asset to the practicing physician as well as to scientific investigator, as it not only touches the great field of nutrition metabolism but many other problems which are still in the process of investigation.

RECENT ADVANCES IN BACTERIOLOGY AND THE STUDY OF THE INFECTIONS—Henry J. Dible, M. B. M. R. C. P. Professor of Pathology and Bacteriology in the Welsh National Medical School. Published by P. Blackiston's Son and Company, Philadelphia, Pa., 1929.

This little book is one of the series entitled, "The Recent Advance Series," designed to give up-to-date knowledge along the several lines. Here we have a review of the most recent changes in the subject and the indications showing the lines upon which it is developing.

HYGIENE AND PUBLIC HEALTH—(Parkes and Kenwood) Eighth Edition. Revised by Henry R. Kenwood, C. M. G., M. B., F. R. S., Edin., D. P. H. Lon. and Harold Kerr, O. B. E., M. D. Edin., D. P. H. Camb. with 91 illustrations, including two plates. Price \$7. P. Blackiston's Son & Co., Philadelphia, Pa.

This work will be found invaluable for all directly engaged in public health work either as doctors or as sanitary engineers. It will have a large appeal to the medical profession in general in as much as the whole profession has always concerned itself with the prevention of disease. It is well written, a scholarly work, concise in its treatment of the various subjects that come within its scope.

FIRST RESULT OF COLD RESEARCH ANNOUNCED

Preliminary results of the study of the common cold being carried on at the Johns Hopkins Medical school and School of Hygiene have just been announced by Dr. James A. Doull to the Johns Hopkins Medical Society. Most significant of the findings so far are the facts that there is apparently no immunity to common colds, that no evidence exists of any association between fre-

quency of common colds and defects of nose and throat, and that poor breathing space probably does affect the duration of the cold.

These results were reported from the study of 181 medical student volunteers and are limited to the months of October and November, 1928, although the study is being continued. Dr. Doull emphasized the fact that this is a very limited class of subjects, all being adults of approximately the same age. Arrangements are being made to extend the clinical studies to children of the families that are now part of the epidemiological studies being made by the School of Hygiene.

Dr. Doull presented statistics of the presence or absence of nasopharyngeal defects among both those having colds and those not having any during the two month period. The nasopharyngeal factors included diseased condition of tonsils, adenoids, mucous membrane, septum, and pharynx and the presence or absence of tonsils and adenoids. No significant differences in these factors appeared between the two groups of subjects.

Of 87 men having good breathing space, only 13 or 15 per cent had colds persisting longer than 10 days. Of 23 who had poor breathing space, 10 or 44 per cent had colds lasting longer than 10 days. This suggests a relation between breathing space and duration of colds, but is not conclusive.

The relation between all respiratory diseases, such as colds, influenza, pneumonia, etc., is also being studied. During the recent influenza epidemic it was noticed that a big increase of colds with fever took place during December and January. Nasal obstruction and discharge were less frequent in the colds of January and December than those of the October-November period, while headaches and general malaise were more frequent in December and January. Some colds with fever did occur during October and November and this brings up the question of whether these earlier feverish colds were of a type different from those of the epidemic or whether they were of the same type and merely the earliest occurrences of epidemic cases—Science Service.

HUMAN MOUTH IS THE BODY'S ELLIS ISLAND

We do not merely dig our graves with our teeth, as dieticians often warn us. We welcome the causes of disease and death with our mouths. The common organ of speech and eating is also the way into our bodies for all kinds of germs and internal parasites, Prof. C. A. Kofoed of the University of California pointed out, in an address before the recent meeting of the American Association for the Advancement of Science in New York.

Strangely enough, though the mouth harbors many kinds of bacteria its population of protozoa, or primitive microscopic animals, is relatively limited. Only two species occur commonly, and these are among the organisms responsible for pyorrhea. The other protozoans pass on through, to establish themselves elsewhere inside us.

Commenting on the mouth as a gate of infection, Prof. Kofoed said:

"The vertebrate mouth from the standpoint of the parasitologist is one of the main portals of entry for parasitic infections of the digestive tract and its morphological annexes. In the case of civilized man, whose body is so generally protected elsewhere by clothing, shoes, hat and gloves, its relative importance becomes even

greater, especially when we add the additional factor of the mobile hand and opposable thumb, the use of implements and the infantile tendency to put anything the hand grasps into the mouth.

"The mouth of man is one of the greatest areas for contact with the environment. Through the posterior nares the inhaled air and the dust and germs collected from it on the surfaces of the nasal cavities have an indirect access to the buccal cavity. The food daily passed through the mouth, though weighing only several pounds, has passed through the hands of who knows how many hundreds of persons, sweating coolies rolling tea leaves in Chinese godowns, laborers in Arabia, Sao Paulo or Limon washing out coffee beans, Malays in Batavia roasting chocolate beans, negroes in Havana or Filipinos in Honolulu handling sugar, Mexicans picking oranges in Riverside, and so on through the long list of essentials and relishes that supply and embellish our daily menu. How far we should have to travel if we should attempt to subvert the rest of our bodies to the geographical range of environment which has been in contact with the foods and drinks which we daily introduce into our mouths. Truly, how provincial is the rest of our corporal substance in comparison with the travelled versatility of our oral cavity! How varied, too, are the substances which come in daily contact here with delicate mucous membrane. They range in temperature from below freezing to nearly boiling point and include both acids and bases, essential oils, fats and alkalies, sugars, salts and proteins of the widest range. Even under the most rigorous treatment of any mode of physiotherapy no other part of our body could receive daily so varied applications of the stimulating materials from the external world.

"The mouth is also a region of no little mechanical shock and impact. Powerful muscles bring the teeth in contact with food which is ground up and mixed with the saliva. The teeth upon which this impact is first received transmit the pressure to the delicate tissues which invest their imbedded surfaces, and thence to the bony alveolar sockets in which they rest. No other part of the body receives such an impact upon so restricted a surface, except possibly the soles of the feet of the hobo or the athlete."—Science Service.

FLU CONTINUES DECREASE, MEASLES IS PREVALENT

Influenza continues to decrease, although the number of cases reported is still abnormally high. For the week ending February 16, 9,482 cases were reported to the U. S. Public Health Service. This is a decrease of over 10,000 cases from the week before. Measles cases have become as numerous as influenza. For the week just ended 8,210 cases were reported. This may be only the usual seasonal rise, as this is the time of year when measles is prevalent. Still, the figure is considered rather high.

The epidemic of influenza spoiled what would have been an enviable year for good health by raising the death rate for the last quarter of 1928, statistics from the Metropolitan Life Insurance company show. The December death rate for influenza-pneumonia was 151.2 per 100,000, as compared with 102.5 in December, 1927. Since the epidemic continued into the first two months of this year, it is likely that 1929 also will have its health record handicapped.—Science Service.